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SYNTHESIS

Vegetation of Europe: hierarchical floristic classification system of vascular plant, bryophyte, lichen, and algal communities

Ladislav Mucina, Helga Bültmann, Klaus Dierßen, Jean-Paul Theurillat, Thomas Raus, Andraž Čarni, Kateřina Šumberová, Wolfgang Willner, Jürgen Dengler, Rosario Gavilán García, Milan Chytrý, Michal Hájek, Romeo Di Pietro, Dmytro Iakushenko, Jens Pallas, Fred J.A. Daniëls, Erwin Bergmeier, Arnoldo Santos Guerra, Nikolai Ermakov, Milan Valachovič, Joop H.J. Schaminée, Tatiana Lysenko, Yakiv P. Didukh, Sandro Pignatti, John S. Rodwell, Jorge Capelo, Heinrich E. Weber, Ayzik Solomeshch, Panayotis Dimopoulos, Carlos Aguiar, Stephan M. Hennekens & Lubomír Tichý

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Algal communities; Alliance; Azonal vegetation; Bryophyte communities; Class; European Vegetation Survey; EuroVegChecklist; International Code of Phytosociological Nomenclature; Lichen communities; Order; Syntaxonomy; Thallophyte vegetation; Vascular plant communities; Vegetation classification; Zonal vegetation

Abbreviations
Art = article of the ICPN; EU = European Union; EVC = EuroVegChecklist (= the syntaxonomic system); EVS = European Vegetation Survey (Working Group of IAVS); IAVS = International Association for Vegetation Science; ICPN = International Code of Phytosociological Nomenclature (3rd edition).

Nomenclature
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Mucina, L. (corresponding author, Laco.Mucina@uwa.edu.au)[1,2],
Bültmann, H. (bultman@uni-muenster.de)[40],
Dierßen, K. (kdierssen@ecology.uni-kiel.de)[4],
Theurillat, J.-P. (jean-paul.theurillat@unige.ch)[5,6],
Raus, T. (t.raus@bgbm.org)[7],
Čarni, A. (carni@zrc-sazu.si)[8,9,10],
Šumberová, K. (katerina.sumberova@ibot.cas.cz)[11],
Willner, W. (wolfgang.willner@vinca.at)[12,13],
Dengler, J. (juergen.dengler@uni-bayreuth.de)[14,15],

Abstract

Aims: Vegetation classification consistent with the Braun-Blanquet approach is widely used in Europe for applied vegetation science, conservation planning and land management. During the long history of syntaxonomy, many concepts and names of vegetation units have been proposed, but there has been no single classification system integrating these units. Here we (1) present a comprehensive, hierarchical, syntaxonomic system of alliances, orders and classes of Braun-Blanquet syntaxonomy for vascular plant, bryophyte and lichen, and algal communities of Europe; (2) briefly characterize in ecological and geographic terms accepted syntaxonomic concepts; (3) link available synonyms to these accepted concepts; and (4) provide a list of diagnostic species for all classes.

Location: European mainland, Greenland, Arctic archipelagos (including Iceland, Svalbard, Novaya Zemlya), Canary Islands, Madeira, Azores, Caucasus, Cyprus.

Methods: We evaluated approximately 10 000 bibliographic sources to create a comprehensive list of previously proposed syntaxonomic units. These units were evaluated by experts for their floristic and ecological distinctness, clarity of geographic distribution and compliance with the nomenclature code. Accepted units were compiled into three systems of classes, orders and alliances (EuroVegChecklist, EVC) for communities dominated by vascular plants (EVC1), bryophytes and lichens (EVC2) and algae (EVC3).

Results: EVC1 includes 109 classes, 300 orders and 1108 alliances; EVC2 includes 27 classes, 53 orders and 137 alliances, and EVC3 includes 13 classes, 24 orders and 53 alliances. In total 13 448 taxa were assigned as indicator species to classes of EVC1, 2087 to classes of EVC2 and 368 to classes of EVC3. Accepted syntaxonomic concepts are summarized in a series of appendices, and detailed information on each is accessible through the software tool EuroVegBrowser.

Conclusions: This paper features the first comprehensive and critical account of European syntaxa and synthesizes more than 100 yr of classification effort by European phytosociologists. It aims to document and stabilize the concepts and nomenclature of syntaxa for practical uses, such as calibration of habitat classification used by the European Union, standardization of terminology for environmental assessment, management and conservation of nature areas, landscape planning and education. The presented classification systems provide a baseline for future development and revision of European syntaxonomy.

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Gavilán García, R. (rgavilan@farm.ucm.es)[16], **Chytrý, M.** (chytry@sci.muni.cz)[17], **Hájek, M.** (hajek@sci.muni.cz)[17], **Di Pietro, R.** (romeo.dipietro@uniroma1.it)[18], **Iakushenko, D.** (d.iakushenko@wnb.uz.zgora.pl)[19,20], **Pallas, J.** (Jens.Pallas@gmx.de)[21], **Daniëls, F.J.A.** (daniels@uni-muenster.de)[3], **Bergmeier, E.** (erwin.bergmeier@bio.uni-goettingen.de)[22], **Santos Guerra, A.** (asantos0511@gmail.com)[23], **Ermakov, N.** (brunnera@mail.ru)[24,25], **Valachovič, M.** (Milan.Valachovic@savba.sk)[26], **Schaminée, J.H.J.** (Joop.Schaminee@wur.nl)[27,28], **Lysenko, T.** (ltm2000@mail.ru)[29], **Didukh, Y.P.** (ya.didukh@gmail.com)[30], **Pignatti, S.** (sandro.pignatti@gmail.com)[31], **Rodwell, J.S.** (johnrodwell@tiscali.co.uk)[32], **Capelo, J.** (jorge.capelo@iniav.pt)[33,34], **Weber, H.E.** (heweber@osnanet.de)[35,36], **Solomeshch, A.** (aizsolomeshch@ucdavis.edu)[37], **Dimopoulos, P.** (pdimopul@cc.uoi.gr)[38], **Aguiar, C.** (cfaguiar@ipb.pt)[39], **Hennekens, S.M.** (stephan.hennekens@wur.nl)[27], **Tichý, L.** (tichy@sci.muni.cz)[17]

[1]Iluka Chair in Vegetation Science and Biogeography, School of Plant Biology M084, The University of Western Australia, 35 Stirling Highway, Crawley, Perth, WA 6009, Australia;
[2]Department of Geography and Environmental Studies, Stellenbosch University, Private Bag X1, Matieland 7602, Stellenbosch, South Africa;
[3]Institute of Plant Biology and Biotechnology, University of Münster, Schlossplatz 8, D-48143, Münster, Germany;
[4]Institute for Ecosystem Studies, Christian Kiel University, Olshausenstraße 75, D-24118, Kiel, Germany;
[5]Centre Alpien de Phytogéographie, Fondation J.-M. Aubert, Case postale 71, CH-1938, Champex-Lac, Switzerland;
[6]Section of Biology, University of Geneva, Case postale 60, CH-1292, Chambésy, Switzerland;
[7]Botanic Garden and Botanical Museum Berlin-Dahlem, Free University of Berlin, Koenigin-Luise-Str. 6-8, D-14195, Berlin, Germany;
[8]Institute of Biology, Scientific Research Center of the Slovenian Academy of Sciences and Arts, Novi trg 2, SI-1001, Ljubljana, Slovenia;
[9]University of Nova Gorica, Vipavska 13, SI-5000, Nova Gorica, Slovenia;
[10]Macedonian Academy of Sciences and Arts, Bul. Krste Misirkov, 2, P.O. Box 428, MK-1000, Skopje, Republic of Macedonia;
[11]Department of Vegetation Ecology, Institute of Botany, The Czech Academy of Sciences, Lidická 25/27, CZ-602 00, Brno, Czech Republic;
[12]VINCA – Vienna Institute for Nature Conservation and Analyses, Giessergasse 6/7, A-1090, Wien, Austria;
[13]Department of Botany and Biodiversity Research, University of Vienna, Rennweg 14, A-1030, Wien, Austria;
[14]Plant Ecology, Bayreuth Center of Ecology and Environmental Research (BayCEER), University of Bayreuth, Universitätsstr. 30, D-95447, Bayreuth, Germany;
[15]Synthesis Centre (sDiv), German Centre for Integrative Biodiversity Research (iDiv) Halle-Jena-Leipzig, Deutscher Platz 5e, D-04103, Leipzig, Germany;
[16]Departamento de Biología Vegetal II, Facultad de Farmacia, Universidad Complutense, E-28040, Madrid, Spain;
[17]Department of Botany and Zoology, Masaryk University, Kotlářská 2, CZ-611 37, Brno, Czech Republic;
[18]Department of Planning, Design and Architecture Technology, Environment and Landscape Section, University of Rome 'La Spanienza', Via Flaminia 72, I-00198, Roma, Italy;
[19]Faculty of Biological Sciences, University of Zielona Góra, Z. Szafrana 1, PL-65 516, Zielona Góra, Poland;
[20]Rivne Nature Reserve, Dubky-Rozvylka, UA-34503, Sarny, Ukraine;
[21]Kanalstraße 81, D-48147, Münster, Germany;
[22]Department of Vegetation and Plant Diversity Analysis, Albrecht von Haller Institute of Plant Sciences, University of Göttingen, Untere Karspüle 2, D-37073, Göttingen, Germany;
[23]Unidad de Botánica, Jardín de Aclimatación de La Orotava-ICIA, C. Retama 2, E-38400, Puerto de La Cruz, Tenerife, Spain;
[24]Laboratory of Ecology and Geobotany, Central Siberian Botanical Garden, Russian Academy of Sciences, Zolotodolinskaya 101, Novosibirsk, 630090, Russian Federation;
[25]Laboratory of Flora and Vegetation, Nikitskiy Botanical Garden, Yalta, Nikita, Crimea;
[26]Institute of Botany, Slovak Academy of Sciences, Dúbravská cesta 9, SK-845 23, Bratislava, Slovakia;
[27]Alterra, Wageningen UR, Droevendaalsesteeg 3, NL-6708 PB, Wageningen, The Netherlands;
[28]Institute for Water and Wetland Research, Radboud University Nijmegen, P.O. Box 8010, NL-6500 GL, Nijmegen, The Netherlands;
[29]Department of Problems of Phytodiversity, Institute of Ecology of the Volga River Basin, Russian Academy of Sciences, RU-445003, Togliatti, Russia;
[30]M.G. Kholodny Institute of Botany, National Academy of Sciences of Ukraine, 2, Tereschenkivska, UA-01601, Kyiv, Ukraine;
[31]Department of Environmental Biology, University of Rome 'La Sapienza', Città Universitaria, I-00165, Roma, Italy;
[32]7 Derwent Road, Lancaster, LA1 3ES, UK;
[33]National Institute for Agrarian and Veterinary Research, Herbarium, Avenida da República, Quinta do Marquês, P-2780-157, Oeiras, Portugal;
[34]LEAF Foundation for Science and Technology Research Centre, Superior Institute of Agronomy, University of Lisbon, Tapada da Ajuda, P-1349-107, Lisbon, Portugal;
[35]Department of Biology, University of Vechta, Driverstrassse 22, D-49377, Vechta, Germany;
[36]Am Buehner Bach 12, D-49565, Bramsche, Germany;
[37]Department of Plant Sciences, University of California Davis, One Shields Ave., Davis, CA, 95616, USA;
[38]Faculty of Environmental and Natural Resources Management, University of Patras, G. Seferi 2, GR-30100, Agrinio, Greece;
[39]CIMO-Mountain Research Center, Politechnic Institute of Bragança, Apartado 1112, P-5301-855, Bragança, Portugal;
[40]Michaelweg 40, D-48149, Münster, Germany

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Introduction

Vegetation is one of the most important elements of the biosphere – the core element supporting life of many other organisms – providing the engine of ecosystem functions serving life on our planet and regulating geomorphological and atmospheric processes. Vegetation is an extremely complex phenomenon, and understanding its functioning requires understanding of the origins and nature of its complex patterns. Simplifying vegetation patterns by means of classification into conceptually manageable and functionally logical units, called 'plant communities', 'vegetation types' or 'syntaxa', is one of the core tasks of vegetation science. Therefore, for various practical and academic reasons, vegetation can be and should be classified (Mucina 1997a; De Cáceres et al. 2015). The complexity alone offers many ways to classify it – using species, plant functional types, features of horizontal or vertical stratification, position in the landscape and along major ecological gradients, just to list the most important ones (see Whittaker 1978 for a smorgasbord of various approaches).

Traditionally, vegetation classification has been dominated by the analysis of lists of species with some measure of abundance recorded in vegetation plots (often called 'relevés') as the *lingua franca* (Braun-Blanquet 1964). Indeed, the species is not only an evolutionary unit, but also a carrier of ecological information, which can be valuable in identifying and describing vegetation patterns and vegetation types and interpreting their nature. For this reason, species have served for over a century as the major attribute for describing vegetation patterns, defining vegetation types and constructing vegetation typologies, such as vegetation classification systems (see Braun-Blanquet 1964; van der Maarel 1975; Westhoff & van der Maarel 1978; Mucina 1997a; Peet & Roberts 2013; De Cáceres et al. 2015).

The species-focused approach and methodology was born in Europe and gave rise to a scientific discipline called 'phytosociology' (also known as 'phytocoenology' or 'plant sociology'). From the outset, phytosociology has applied a standardized approach to sample, describe and classify vegetation (Braun-Blanquet 1921, 1928, 1951, 1964). A formal framework for the naming and organization of syntaxa was introduced in 1976 as the International Code of Phytosociological Nomenclature (see Weber et al. 2000). Over the past roughly 90 yr (catalyzed by the publication of the first edition of Braun-Blanquet's textbook in 1928 and its English translation in 1932) an enormous amount of phytosociological literature has accumulated, with diverse proposals for classifying many kinds of vegetation throughout Europe and beyond. Such endeavours have been poorly coordinated and proposals for structuring the syntaxonomic hierarchy from the level of the association right up to classes were often contentious. Moreover, only occasionally have there been more fundamental accounts of the theoretical basis of this enterprise (e.g. Mueller-Dombois & Ellenberg 1974; Westhoff & van der Maarel 1978; Géhu & Rivas-Martínez 1981; Pignatti et al. 1995; Schaminée et al. 1995a; Mucina 1997a,c; Theurillat 1997; De Cáceres et al. 2015).

Vegetation surveys of particular countries or parts of countries have brought a certain degree of regional stability to the classification of vegetation types, particularly over the last two decades (e.g. Rodwell 1991–2000; Grabherr & Mucina 1993; Mucina et al. 1993a,b; Schaminée et al. 1995b, 1996, 1998; Stortelder et al. 1999; Chytrý 2007–2013). However, these projects have varied greatly in their scope and detail. Surveys of some kind have now been published for nearly every European country (see Mucina 2013; Jiménez-Alfaro et al. 2014a). The synopsis of surveys of European vegetation (Appendix S2) provides a gateway to this enormous depth of knowledge of European vegetation scientists about the patterns of vegetation of their home continent.

Meanwhile, the need to undergird international initiatives in nature conservation across Europe with a sound understanding of the diversity of vegetation types provides an additional incentive to harmonize phytosociological classifications and influence environmental policy. It was within the frame of the CORINE project (Coordination of Information on the Environment) that more standardized and comprehensive hierarchical classifications of European habitats/biotopes were first developed. The CORINE Biotopes Classification (Commission of the European Communities 1991; Devillers et al. 1991) provided the original framework for the definition of the 'Natural habitat types of Community interest' listed in Annex I of the Habitats Directive 92/43/EEC (Commission of the European Communities 1991; Evans 2010), which was subsequently extended to the entire Palaearctic (Devillers & Devillers-Terschuren 1996).

The Annex I list of habitats aimed to cover the most endangered natural and semi-natural ecosystems in the European Union (Evans 2012). It was extended as new Member States joined the EU. The definitions of the Annex I habitat types are often based on phytosociology or similar descriptions of species assemblages, and also contain geographic indications and descriptors of physical characteristics of the habitat. The list has a simple hierarchical structure, but the delimitations of individual types range from very broad to quite narrow. The quality of descriptions of the types also varies from short descriptions to extensive texts with details on subtypes, syntaxa and

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species. Several descriptions are equivocal, leading to different interpretations of the same habitat type in different EU Member States.

The EUNIS Habitat Classification (Davies & Moss 1999; Davies et al. 2004; Moss 2008) brought structural redefinition and simplicity to the previous habitat classifications, providing a common European reference set of units within a single hierarchical frame. Effectively, EUNIS (European Nature Information System) provides a comprehensive, hierarchical classification of terrestrial, freshwater and marine habitats for the whole of the European continent, associated islands and adjacent seas. Cross linkages have enabled users of other habitat classifications to relate their national schemes to this international system, in particular to Annex I habitats of the EU Habitats Directive.

Although EUNIS is a hierarchical classification of habitats, it is again a complex mixture of units based on various, often incompatible, concepts and distinguished at different scales, even within a single hierarchical level. Some habitats are abiotic while others are of interest because of their distinctive fauna. Some vegetated habitats are precisely defined, whereas others include considerable internal heterogeneity; some are defined based on species composition, while others have a purely physiognomic basis; yet others are complexes of habitats at a landscape scale rather than single relatively homogeneous habitat types. The opportunity to bring consistent phytosociological definitions to bear on such a diverse set of systems and applications promises many benefits.

In this paper and associated supporting information we (1) present a comprehensive, hierarchical, syntaxonomic system of alliances, orders and classes of Braun-Blanquet syntaxonomy for vascular plant, bryophyte and lichen, and algal communities of Europe; (2) briefly characterize in ecological and geographic terms all accepted syntaxonomic concepts; (3) link all available synonyms to these accepted concepts; and (4) provide a list of diagnostic species for each accepted class.

Methods

European vegetation survey: the roots of the EuroVegChecklist

In an attempt to develop a more coherent overview of vegetation types across the whole of Europe and to foster a new spirit of collaboration among phytosociologists, the European Vegetation Survey (EVS), a working group of the International Association for Vegetation Science (IAVS), has convened annual meetings since 1992 (Pignatti 1990; Mucina et al. 1993c; Rodwell et al. 1995). Besides providing formal support for national programmes of vegetation survey, the EVS has devoted particular meetings to improving understanding of the syntaxonomy and ecology of some major vegetation types across Europe. These meetings resulted in the formulation of phytosociological data standards (e.g. Schaminée & Hennekens 1995; Mucina et al. 2000; Dengler et al. 2011; Chytrý et al. 2016) and initiated supra-regional and continent-wide synthetic efforts leading to publication of international syntaxonomic revisions and studies on broad-scale vegetation patterns (e.g. Theurillat et al. 1995; Zuidhoff et al. 1995; Dimopoulos et al. 1997, 2005; Valachovič et al. 1997; Brullo & Guarino 1998; Dengler et al. 2013; Jiménez-Alfaro et al. 2014b). In addition, the EVS platform provided support for the emergence of many national and regional vegetation surveys such as those in the Czech Republic (Chytrý 2007–2013), Poland (Kącki et al. 2013), Russia (Solomeshch et al. 1997; Ermakov 2012), Slovakia (Valachovič et al. 1995; Jarolímek et al. 1997; Valachovič 2001; Kliment & Valachovič 2007; Vantarová Hegedüšová & Škodová 2014) and Slovenia (Šilc & Čarni 2012).

In parallel, the EVS has also undertaken a preliminary synthesis of existing syntaxa from Europe, including Macaronesia, down to the level of alliance. The scheme used the framework of classes proposed by Mucina (1997b) and was derived top-down by integrating validly published orders and alliances, using expert knowledge of certain European regions or vegetation types provided by various EVS members. The syntaxon names with author citations, synonyms, descriptors and bibliographic sources were encoded in the no longer functional SYNTAXA database (Dring 2000).

With funding from the European Topic Centre for Nature Conservation (now the European Topic Centre for Biological Diversity), under contract to the European Environment Agency, an EVS team developed a crosswalk between phytosociological units to the alliance level and terrestrial and freshwater habitats of the EUNIS classification at Level 3. The report, *The Scientific Background to the EUNIS Habitat Classification* (Rodwell et al. 1998), provided the first complete overview of European vegetation types to the level of alliance, accompanied by brief verbal definitions of these units and crosswalks between the EUNIS habitats and syntaxa. This background also provided a limited synonymy and bibliography for the phytosociological units. The list of syntaxa, the crosswalk to EUNIS habitats and an introduction to the background and application of the work were published in *The Diversity of European Vegetation* (Rodwell et al. 2002). Since that time, changes to the EUNIS Habitat Classification and much more substantial changes to the developing syntaxonomic (vegetation classification) system have prompted the need to rework the crosswalks between these classifications and provide a sounder basis for environmental policy.

The idea of constructing the EuroVegChecklist was seeded by publication of Rodwell et al. (2002). This

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account (widely used by vegetation ecological community and the European Union nature management bodies) did not contain synonyms, authors of the featured syntaxa or lists of diagnostic species. Further, the subsequent decade was marked by a major boost in syntaxonomy through the activities of the European Vegetation Survey and other major national projects of vegetation survey, such as those in Spain and Portugal (Rivas-Martínez et al. 1998, 2001, 2002, 2011; Costa et al. 2012), France (Bardat et al. 2004) and Italy (Biondi et al. 2014). As a consequence, there was a clear need for a comprehensive overhaul and elaboration of the vegetation classification system.

Compilation of the EuroVegChecklist

This paper features three syntaxonomic systems – one for communities dominated by vascular plants (EuroVegChecklist 1, EVC1), one for communities dominated by bryophytes and lichenised fungi (lichens) (EuroVegChecklist 2, EVC2) and one for communities dominated by algae (EuroVegChecklist 3, EVC3). From the start, the authors agreed that our major target was to detect every published name of a high-ranked syntaxon of the Braun-Blanquet approach ever published for Europe and place it into the context of the classification systems, either as a currently valid name or as a synonym.

The basic approach used in the creation of the EuroVegChecklist was the critical compilation and evaluation of high-rank syntaxa for the vegetation of Europe:

Step 1: The classification system of Rodwell et al. (2002) served as the starting point for the revision of vascular plant communities, whereas the syntaxonomic systems for bryophyte and lichen and for algal communities are new.
Step 2: Synonyms existing in the database of European syntaxa held at Lancaster University (Rodwell et al. 1998; Dring 2000) were assigned to the respective accepted concepts and names.
Step 3: New syntaxonomic concepts were incorporated into the system as they were discovered in the literature or published during the compilation of EVC1.
Step 4: Provisional classification systems for individual classes, including subordinate units and their synonyms, were critically revised by pertinent experts.
Step 5: Difficult nomenclatural cases were solved through the involvement of experts in handling the ICPN (J.-P. Theurillat, H.E. Weber, W. Willner, J. Pallas).
Step 6: In some cases mere nomenclatural revision was not sufficient and preliminary syntaxonomic syntheses of the available data of syntaxonomically complex vegetation types were initiated, with many yielding useful results (both of nomenclatural and syntaxonomic nature) pertinent to the aims of EVC1.

As major sources of information, in addition to expert knowledge of the authors of this conspectus, we consulted:
1 all published national and pan-European vegetation surveys (see Appendix S2);
2 all accessible volumes of the major international journals and series that publish syntaxonomic papers;
3 most available monographs containing vegetation descriptions of European regions;
4 phytosociological 'grey literature', including theses, and reports; and
5 relevant internet resources.

Geographic extent of the EuroVegChecklist

The EuroVegChecklist encompasses a larger area than Europe as defined by its tectonic borders (which place the Ural Mountains as the eastern border, and the continuation of this border along the Ural River to the Caspian Sea shore and recognizing the natural borders defined by the Arctic Ocean, Atlantic Ocean, Mediterranean Sea and Black Sea). In particular, we include:

1 Greenland, geographically part of the North American Arctic archipelago, yet politically part of Denmark, hence under European Union legislation;
2 Iceland, which is shared between the European and North American tectonic plates, but has always been considered as a part of Europe;
3 the Canary Islands and Madeira (also known as Macaronesia), which can be tectonically considered part of Africa rather than Europe, yet they are politically part of Spain and Portugal, respectively;
4 the Azores, located at the spine of the Atlantic Ridge, but belonging politically to Portugal;
5 the entire northern piedmont, flanks and the ridge of the Greater Caucasus;
6 Cyprus, because the Greek part of this island is a member of the European Union.

The area considered covers more than 12 400 000 km^2 and spans latitudes between 27°38′ N (Canary Islands) and 83°40′ N (Greenland), culminating at an altitude of 5642 m (Mount Elbrus, Greater Caucasus). From the bioclimatic point of view, this area encompasses six zonobiomes (*sensu* Walter 1964).

EuroVegChecklist 1 (EVC1): conspectus of vegetation units dominated by vascular plants

Our original intention was to revise and complement the system presented in two major recent lists of European vegetation units, those of Mucina (1997b) and Rodwell et al. (2002). These systems concentrated on vegetation units (syntaxa) dominated by vascular

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plants. For practical communication reasons, we have dubbed this system EuroVegChecklist 1 (EVC1). Traditionally, the class *Charetea*, dominated by green algae, has been featured in syntaxonomic systems dominated by vascular plants, but for the sake of consistency we moved it to EVC3 (see below).

The EVC1 features the skeletal portion of the hierarchical syntaxonomic system of the Braun-Blanquet (floristic–sociological) approach – the levels of class, order and alliance (see Weber et al. 2000). The supplementary syntaxonomic ranks of subclass, suborder and suballiance are covered by the regulations of the ICPN (Weber et al. 2000) and frequently used, especially in southern Europe (e.g. Bardat et al. 2004; Blasi 2010; Rivas-Martínez et al. 2011) but also elsewhere (e.g. Berg et al. 2004). Yet, we refrained from including them in our Conspectus for the following practical reasons:

1 the categories of subclass, suborder and suballiance have not enjoyed as wide acceptance and use as the principal high-rank categories and as a consequence their development is geographically consistent across Europe;
2 their concepts are often interchangeable with widely accepted syntaxa of principal ranks;
3 there is no agreement in place on the conceptual difference between the syntaxa of principal and supplementary ranks;
4 their use makes the formal system unnecessarily complicated and reduces its clarity.

Instead of using the formal subclasses, suborders and suballiances, we used informal categories such as 'groups of orders' or 'groups of alliances', especially under circumstances where there were many alliances within an order (e.g. *Potentilletalia caulescentis*) or where the grouping of alliances revealed informative geographic patterns. We have applied the same approach in classes rich in orders.

EuroVegChecklist 2 (EVC2): conspectus of vegetation units dominated by bryophytes and lichens

Under the leadership of Klaus Dierßen and Helga Bültmann, we added the system of communities of bryophytes and lichens. Since the early days of vegetation classification, communities of non-vascular plants have been recognized as distinct vegetation units, especially in environments where they play a major ecological role, such as the arctic zone or alpine belt, and on rocks or tree bark. Because of their poikilohydric way of life, bryophytes and lichens reflect habitat conditions differently from vascular plants, and the life strategies of poikilohydric and homoiohydric species are very different (During 1992; Dierßen 2001; Bültmann 2012). Another feature of thallophyte cryptogams is the wide distributional range of many species and communities (Feuerer & Hawksworth 2007; Bültmann 2010).

Earlier discussions about how to deal with thallophyte vegetation units (Barkman 1968, 1973; Wilmanns 1970) led to the conclusion that they merit a classification system of their own. Although the abstract units of thallophyte vegetation do not always correspond to phytocoena, they can, nevertheless, be classified into syntaxa defined by floristic–sociological criteria (Weber et al. 2000: Definition I). Traditionally, the units are named either in the same way as phytocoena or terms used by synusial systems are applied.

Synusiae, or micro-communities, can be considered either as elements within plant associations or as discrete, separate syntaxonomic units on their own at the hierarchical levels of association, alliance, order and class. In extreme site conditions, such as exposed rock surfaces, this distinction disappears.

In the strict synusial approach, a somewhat different typological nomenclature has been proposed for bryophytes and lichens: *union* at the hierarchical level of association, *federatio* for alliance, *ordula* for order, *classula* for class. For details on this approach see the original discussions (Wilmanns 1970; Barkman 1973) and textbooks (e.g. Dierschke 1994; Dierßen 2001). In the 1980s, there was a renewal in France of the unistratal concept of plant communities (Lippmaa 1933, 1939) according to which associations of vascular plant communities are conceived more or less as synusiae or one-layer communities. In this integrated synusial phytosociology (Gillet 1988; Gillet et al. 1991; Julve 1993; Gillet & Gallandat 1996), the sum of these different associations make up a phytocoenon.

According to Barkman (1973), micro-communities and synusiae are both structural parts of a phytocoenosis, characterized by a specific floristic composition and special microhabitat. Additionally, in synusiae, all species must belong to one stratum with the same periodicity and manner of exploiting the environment. As for the cryptogamic species of a coenosis, the latter conditions are often not fulfilled and the term micro-community or community with the same ranks and terminations as for phytocoena is to be preferred. This also emphasizes their syntaxonomic equivalence to communities. The term *synusia* could then be used in a more restricted sense (e.g. for only the reindeer lichens of a micro-community, the large foliose lichens of the *Lobarion*, or the pleurocarpous mosses in a grassland).

EuroVegChecklist 3 (EVC3): conspectus of vegetation units dominated by algae

The EVC3 is the first system ever created for algal communities of Europe. The description of algal communities, even for microalgae, has a similar tradition as for bryophytes and lichens (e.g. Jonsson 1912; Gams 1927; Budde

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1930, 1934). Sauer (1937) already described stonewort syntaxa up to the order level. The first algal vegetation overviews, although of limited geographic extent, were presented in Klika & Hadač (1944) and Klika (1948). Monographic studies featuring marine algal communities of the Atlantic Ocean and the Mediterranean Sea were published by Den Hartog (1959), Giaccone (1965) and Pignatti & Pignatti (1966). Giaccone et al. (1993, 1994) and Julve & Manneville (2006) described a range of marine syntaxa. Syntaxa for the epiphytic marine algae and marine microalgae are still scarce (Brockmann 1950; Julve 1992). Freshwater algae are represented by many relevés documenting several alliances from Spain published by Margalef (e.g. 1948, 1951). Freshwater microalgae on the community level were published in numerous papers by Fetzmann (e.g. 1962), and on higher levels by Schlüter (1961), Täuscher (1998), Bobrov et al. (2005) and Bobrov & Chemeris (2012). Syntaxonomic studies of aerophytic microalgae are scarce. The study of soil algae so far has been handled only in the pioneering works of Khaybullina et al. (2004, 2005a,b, 2011). The work of Golubić (1967) on cyanobacterial communities is also of pioneer character.

Structure of the EuroVegChecklist

There are four building elements of each of the three conspecti (EVC1, EVC2 and EVC3), including the *Current correct name* of the syntaxon, a brief *Verbal diagnosis*, a *List of associated synonyms*, and *Remarks* on nomenclatural and syntaxonomic issues of selected syntaxa. An example of the elements associated with the current correct syntaxon name is shown in Fig. 1. A set of references used either in the main body of the syntaxonomic system or in Remarks follows each of the partial conspecti (EVC1, EVC2, EVC3) separately. Each class is further documented by a list of diagnostic species and bibliography that, together with other elements, feed EuroVegBrowser (see below) – an electronic application summarizing data for all the three conspecti.

Current correct name

We have attempted to find and document the current correct name (the name that is validly published and legitimate according to the ICPN) for each syntaxon in the adopted circumscription featured by the conspecti. Naturally, due to the high number of names analysed, some uncertainty remains and the search for the current correct names of some syntaxonomic concepts continues. Many names of syntaxa pertinent to the Central European vegetation have been stabilised by Grabherr & Mucina (1993), Mucina et al. (1993a,b), Dierschke (1996–2008), Dengler et al. (2003, 2004), Berg et al. (2004), Chytrý (2007–2013), Kliment & Valachovič (2007) and Willner &

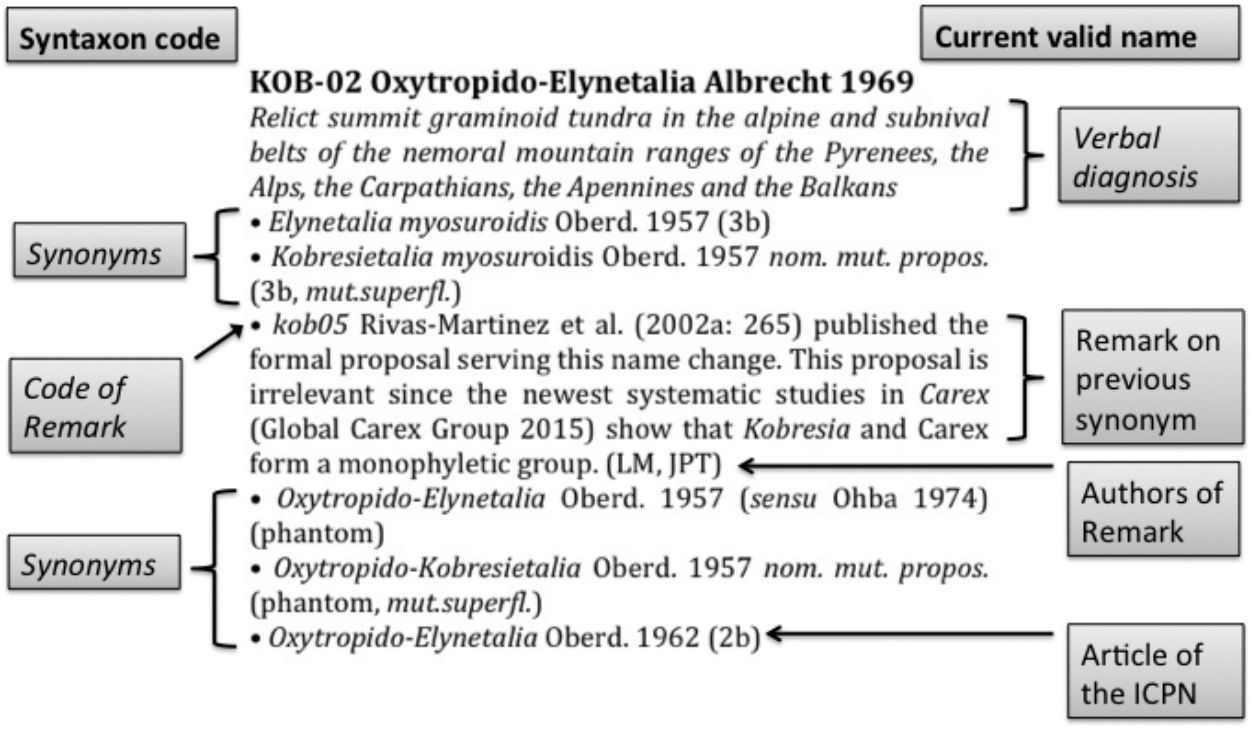

Fig. 1. Guide to the elements of the description of a syntaxon in the EuroVegChecklist.

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Grabherr (2007). The European classes have similarly been stabilized by Mucina (1997b) and those of the Iberian vegetation typology by Rivas-Martínez et al. (1999, 2001, 2002, 2011) and Costa et al. (2012). While working on the syntaxonomic systems of the EuroVegChecklist, we aimed to enhance the nomenclatural stability in a decisive way since thousands of names were checked for nomenclatural correctness. As the volume of phytosociological information in Europe is enormous, it may well be that we have overlooked some names. There are also some names that we have not managed to trace in the literature and their nomenclatural and syntaxonomic status is still pending.

Verbal diagnosis of the syntaxon

The verbal diagnoses were provided as brief text descriptors for accepted syntaxa, a sort of condensed surrogate of a definition of the unit. These diagnoses inform (1) the physiognomy of the vegetation classified within the given unit (e.g. forest, grassland, ericaceous scrub, aquatic vegetation, etc.), sometimes with indication of dominant plant species (e.g. beech forest) or growth form (e.g. grass-dominated); (2) their unifying ecological context (e.g. mesic, nutrient-poor soils, coastal cliffs under sea-spray influence); and (3) their distribution (e.g. 'in the thermomediterranean belt of the Iberian Peninsula'). The terms used in the verbal diagnoses are defined in a Glossary (Appendix S3).

Diagnostic species

For practical reasons (mainly due to many conflicting opinions and persisting genuine lack of data for some vegetation types), we have limited the listing of the diagnostic species to classes. These species are supposed to be either true character species (in the sense of Westhoff & van der Maarel 1978; Mucina 1993) of the class (as well as those considered as character species for subordinate units within the class), or species that otherwise can contribute to recognition of the given vegetation type. The latter could be major dominants (such as *Pinus sylvestris*). These 'shared' species carry an asterisk indicating their shared diagnostic value.

Synonyms and handling of syntaxonomic nomenclature

We have attempted to list all known synonyms for all syntaxa, but this goal likely has not been fully achieved due to the vast volume of phytosociological literature that has accumulated in the course of the last century, together with poor accessibility of some sources. Nevertheless, these lists record reasonably well the development of the concepts and nomenclature of each syntaxon. They are crucial for stabilising the nomenclature of high-rank syntaxa and they may also be utilized in the future as sources for further nomenclatural adjustments and syntaxonomic arguments.

The lists of synonyms became extensive in many cases. There are several reasons for this:

1 the first nomenclature rules were not published until 1976 (Barkman et al. 1976), and the formation and handling of syntaxon names in the past was haphazard;
2 the interpretation of some ICPN articles has differed among authors;
3 misinterpretations of the ICPN and disregard of the rules are still common;
4 the syntaxonomic concepts may differ, depending on the quality and extent of the field material and opinions on the weighting (importance) of particular species (presence, dominance, constancy);
5 some zealous 'splitters' have produced a wealth of synecologically and floristically poorly-defined syntaxa that have not found wide acceptance (Pignatti 1968 described this process as 'inflation of syntaxa');
6 several isolated scientific communities with limited access to international literature have produced their own syntaxonomic concepts and nomenclature largely independently from the larger world literature; and finally
7 Europe is a Babel of nations and languages: very often locally produced papers in a national language are not fully understandable to others.

We apply the term 'synonym' to a name of a syntaxon that is considered conceptually identical (in the sense of sharing the same nomenclatural type) or similar (in the sense of expert opinion on the breadth of the concept) to the accepted type. Some of these names are validly published and legitimate, whereas others are either invalid or illegitimate. We have adopted the 3rd edition of the ICPN (Weber et al. 2000) to establish the nomenclatural status of syntaxon names, and cite the reason for the invalidity or illegitimacy in brackets after synonyms. The other abbreviations used in clarifying the reasons for placement of a name into the synonymy are explained in the header of the EVC1 (see below).

The valid and legitimate names of the units that are conceptually synonymous to the accepted unit are listed as 'synonyms' under the category 'syntaxonomic synonym' ('syntax. syn.'; see Mucina 1993, 1997c and Weber et al. 2000 for more precise definitions). The reasons why they are 'synonymous' mostly reflect priority (the correct name is the oldest valid and legitimate name), but occasionally this pertains to cases when these names were proposed to be recognized as *nomina rejicienda* due to conservation of some younger, yet more widely used name (*nomina conservanda*) or as *nomina rejicienda ambigua* in cases where the use of the concept of the name served as a source of

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confusion. In the list of synonyms we also list the pending inverted (*nom. invers. propos.*), mutated (*nom. mut. propos.)* and putative syntaxonomically dubious concepts (*nomina dubia*). Many of these *nomina proposita* (see Mucina 1993) have been or will be submitted for formal approval (many of them also in this paper for the first time) to the Committee for the Correction and Conservation of Names (CCCN) of the IAVS Working Group for Phytosociological Nomenclature (GPN), the latter having officially replaced, in June 2013, the former Phytosociological Nomenclature Commission.

The *partim* or *pro parte* (*p.p.*) synonyms are names that have been used for a broad syntaxonomic content in the past and that now correspond to at least two separated syntaxa, one including the type of the name, the other(s) being a synonym *pro parte*.

We also list pseudonyms (*'sensu auct., non* XY*'* or *'sensu* AB, *non* XY*'*) in some cases, i.e. names misinterpreted by one or more authors by assigning them a *different* syntaxonomic content than that for which they were originally created according to their type.

'Phantoms' (see Mucina 1993) are yet another category listed among the synonyms. These are names used by various authors ascribing them erroneously to a wrong authority (i.e. either the author(s) of the name or the date is incorrect). Many phantom names were created through citing wrong effective (as defined by the ICPN; Weber et al. 2000) dates of publication.

Remarks

Syntaxonomic categories such as class, order and alliance are much less crisply defined than the classical taxonomic ones, such as genus or species. In part, this stems from the nature of the subject matter, many species being genetically isolated, but vegetation being a continuous phenomenon with ultimately relatively arbitrary divisions. It is, therefore, not surprising that opinions may differ between experts on the same vegetation type. Such discordances have roots in emphasis on different classification criteria – classical floristic composition *vs* vegetation structure, different data sets, ecological vs biogeographic emphasis, local tradition and otherwise biased geographic views, different field experience, etc. It was not easy to find common ground, even among the 32 authors of this Conspectus. In order to address some of these issues we created a 'Remarks' category and used it to:

1 comment on syntaxonomic position in contentious cases;
2 elucidate nomenclatural issues related to validity and legitimacy of the names;
3 correct illegitimate names and validate invalid syntaxonomic concepts;
4 feature alternative opinions to those accepted in the EVCs.

Ordering and grouping of the classes

Various principles have been followed in the past to order vegetation classes in a comprehensive and logical system. Most commonly, classes were ordered into a quasi-linear system according to a so-called 'sociological progression' (Braun-Blanquet 1964; Böttcher 1980). Examples include the surveys by Mucina (1997b) and Rivas-Martínez et al. (1999, 2001). Obviously, such a system reflects some sort of intuitive structural or (and possibly also) functional complexity more than any floristic and/or synecological relations. Others promoted the category of '*divisio*': syntaxon of the highest rank encompassing floristically similar or ecologically related classes (Hadač 1967).

Here we adopt an alternative approach to ordering classes, outlined in its major features by Mucina (2013), which follows the conceptual framework of vegetation zonality and related notions (azonality, intrazonality) as defined by Walter (1964; see also Walter & Box 1976). We start our list with zonal classes – those typical of the biomes as defined by Mucina (2013). We follow an order from the north to the south, spanning Arctic, Boreal, Temperate and Mediterranean Zones (biomes). Intrazonal vegetation is presented in the form of separate groups of classes associated with the respective zones. Azonal vegetation (occurring across several biomes/zones) is grouped according to the main ecological drivers such as moisture regime or salinity. The vegetation of the temperate and mediterranean orobiomes (see Walter 1964; Walter & Box 1976 for definition) is featured within the Temperate and Mediterranean zones, respectively. Anthropogenic vegetation (vegetation of heavily disturbed or man-made habitats) is treated as a separate group of classes. Finally, the vegetation of the Canary Islands, Madeira and the Azores forms its own group of classes.

The main grouping of the bryophyte and lichen classes reflects substrate, with the three groups of syntaxa on soil, on rock and on bark, leaves and wood. The classes are ordered from those dominated by short-lived to long-lived organisms, from occupying acidic to basic as well as from nutrient-poor to nutrient-rich environments; those syntaxa typical of very specific habitats are listed at the end of the system.

The system of the algal syntaxa starts with classes of vegetation occurring in non-marine habitats, ordered from wet to dry environments, and very specific habitats listed at the end. The order of the classes of algae in marine habitats mainly follows the tidal zonation.

Species lists

Extensive species lists that characterize the classes of all three syntaxonomic systems were compiled from available

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literature sources (building upon Mucina 1997b), concentrating especially on studies containing extensive syntaxonomic revisions accompanied by synoptic tables. Many species were assigned to classes using expert opinion, especially that of the co-authors of this paper.

EuroVegSpeciesList 1 (ESL1): list of diagnostic species of the classes of vascular plant vegetation

For ESL1, Mucina (1997a) served as the source of the starting pool of species and their links to the particular EVC1 classes. This pool was then extended by compilation of the literature sources mentioned above, especially syntaxonomic monographs and revisions containing extensive synthetic phytosociological tables. Expert opinion from the author team of this paper and beyond was used to make judgements about problematic cases. Some species were assigned to more than one class. The sources of the species nomenclature (and taxonomic concepts) used in the ESL1 are featured in Appendix S1.

EuroVegSpeciesList 2 (ESL2): list of diagnostic species of the classes of bryophyte and lichen vegetation

The standardized nomenclature of bryophytes largely follows the checklists of European bryophytes (Hodgetts 2015). The lichen list is based on Bültmann (2010), who integrated several checklists and floras (Hafellner & Türk 2001; Santesson et al. 2004; Nimis & Martellos 2008; Søchting & Alstrup 2008; Smith et al. 2009; Roux 2012; Dahlberg & Bültmann 2013; Wirth et al. 2013).

EuroVegSpeciesList 3 (ESL3): list of diagnostic species of the classes of algal vegetation

We relied almost entirely on Guiry & Guiry 2016 (www.algaebase.org; last accessed 16 Mar 2016) as the major source of nomenclature, although some taxonomic checklists (e.g. Schories et al. 2009) were also consulted.

Bibliographic files

We have compiled three bibliographic files (one for each of the syntaxonomic systems; see Appendices S9–S11) that feature the most important syntaxonomic literature sources. As much as possible, the references in these files are linked to a particular class of our conspecti and they represent either the source of the protologue of the class or its subordinate orders and alliances, an important survey, a monograph, a syntaxonomic revision pertinent to the vegetation type represented by the class or an important nomenclatural reference.

Results

Three separate conspecti of European vegetation were prepared: EVC1, comprising vascular plant communities (Appendix 1), includes 109 classes, 300 orders and 1108 alliances; EVC2, comprising bryophyte and lichen communities (Appendix 2), includes 27 classes, 53 orders and 137 alliances; and EVC3, comprising algal communities (Appendix 3), includes 13 classes, 24 orders and 53 alliances.

The Glossary (Appendix S3) explains the terms used in the verbal diagnoses. Ordering of classes, outlined in its major features by Mucina (2013; Table 3), is presented in Appendix S4.

The three conspecti and extensive lists of diagnostic species are made easily accessible through the electronic tool called EuroVegBrowser (Appendix S5). In total 13 448 taxa were assigned as diagnostic of classes of EVC1, 2087 of classes of EVC2 and 368 of classes of EVC3 (Appendices S6–S8). This tool also displays extensive bibliographies with entries linked to classes, which are also available in Appendices S9–S11.

The EuroVegBrowser (EVB) tool was developed as a 32-bit Windows application that collates the syntaxonomic systems (Appendices 1–3), species lists (Appendices S6–S8 and bibliographic files (Appendices S9–S11) and enables viewing and browsing through the synthetized profiles of the particular syntaxa in a hierarchical structure.

The functionality of the EVB is described in Appendix S5. One can download the EuroVegBrowser application from http://www.synbiosys.alterra.nl/euroveg browser/setupEVB.exe

The EuroVegChecklist Expert System (EVC-ES) was developed as a part of the JUICE software (Tichý 2002), freely available from www.sci.muni.cz/botany/juice. It can be used to determine the affinity of vegetation plots to vegetation classes of the EuroVegChecklist. Automated classification is based on detection of diagnostic species of vegetation classes in the plots. A limitation in obtaining correct classification is the possible inconsistency of plant nomenclature between the classified data set and the list of diagnostic species. Misidentifications can also appear in cases of classes that are defined by different structure (vs heathland vs forest) but have a similar species composition.

The manual for the EVC-ES is provided in Appendix S12 and a video demonstrating is functionality is available at http://youtu.be/Z75nra1hgMU.

Last but not least, Appendix 4 collects names of new syntaxa described, validated and typified in the conspecti (EVC 1–3). In this paper, following the rules of the International Code of Phytosociological Nomenclature, we provide protologues (first-time descriptions) of three classes, 11 orders

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and 28 alliances. Validation of some high-rank syntaxa required description or validation of type associations; in total, protologues of four associations were provided as well. All the protologues can be found in relevant Remarks.

Discussion

Although attempts to compile a European or even global classification system of plant communities started already in the 1930s (Braun-Blanquet 1933) and was renewed by Reinhold Tüxen with collaborators in the 1970s (Beeftink & Géhu 1973), these projects were soon abandoned. With the publication of the EuroVegChecklist these attempts have been completed for the first time. The richness of vegetation types featured in the EuroVegChecklist, builds upon more than 100 years of history of vegetation survey in Europe, and is a witness to the fact that Europe is beyond doubt the continent with the best known and understood vegetation patterns.

We expect the EuroVegChecklist to have a profound impact, both on the development of the European (and hopefully also global) vegetation classification system and in practical applications.

Perspectives on the development of the classification of vegetation

Our three classification systems use *alliance, order* and *class* (Braun-Blanquet 1921, 1925; see Westhoff & van der Maarel 1978 for an authoritative review) as the major building blocks of the syntaxonomic hierarchy (see Weber et al. 2000 for definition of the hierarchy). These three ranks, besides the well-accepted (yet often misunderstood) basic rank of *association*, won wide acceptance in the phytosociological community (but see Chytrý 2007–2013, who refrained from using the rank of *order* to simplify the hierarchical system at a national level). The nearly universal acceptance of the three basic syntaxonomic high ranks, however, does not imply that these three ranks are sufficiently operationally well defined to assure uniform use across the spectrum of vegetation types. As any theoretical construct in ecology defined across various spatial and temporal scales, the concepts of the alliance, order and class are context-dependent, and often suffer from strong personal, historical, geographic or other biases.

The context dependence is an inevitable feature of any concept shaped by spatial, temporal (and other) scaling constraints. It governs the rules of delimitation of units at the same rank equally as it governs the rules of distinction between the ranks themselves. Are these two vegetation types dissimilar enough to belong to different alliances? Is this segment of vegetation particular enough to be accommodated in its own class? Should we consider ecological as opposed to geographic variation as the primary source to inform our decision about structuring the syntaxonomic content of an order? Should we consider floristics only or include other criteria (such as vegetation structure) as part of the governing principle of the classification at the class level? Answers to these and similar questions are meaningless without appreciating the importance of the context dependence.

Are we then able to construct generally valid (across the entire variability of vegetation) definitions of the alliance, order and class (as syntaxonomic ranks)? Are we able to coin definitions that would settle general rules on how to recognize those ranks? Pignatti et al. (1995) have attempted this for the *class*. They introduced a set of subjective criteria (among which the contentious term 'homogeneity' plays an important role) to recognize 'good' and 'bad' classes. Some of these criteria (such as 'ecological characterization' and 'coherence of the geographic distribution of character species'; see Table 1 in Pignatti et al. 1995) do implicitly reflect the context dependence. Yet the *intensive definition* (*sensu* Moravec 1975) of the syntaxonomic rank class as offered by Pignatti et al. (1995: '*a vegetation class is the syntaxon of highest rank, defining the common ecological space of the included associations, and recognizable by the occurrence of a common set of characteristic taxa, which are by preference chorologically homogenous*') falls short of being operational enough to cover the whole spectrum of vegetation types. We suggest that the limited success of this attempt is rooted in the failure to recognize that each vegetation context needs its own set of rules, hence its own definition. Currently, the only operational way that probably everybody practising syntaxonomy (vegetation classification based of floristic–sociological principles) would agree upon for how to define a *class*, is the classical Braun-Blanquetian *extensive definition*: a class contains a set of (non-overlapping) *orders* – a situation that is not satisfactory.

The EVC is not poised to solve the problem of context dependence and to offer operational definitions of the ranks of the Braun-Blanquet hierarchical system. It creates, however, a platform to recognize and embrace the context dependence of the definition of alliances, orders and classes by formulating a stable, scientifically sound classification system reflecting the role of hierarchy of environmental and evolutionary (biogeographic) drivers in shaping vegetation complexity of a large geographic area.

A number of largely unknown names of syntaxa have been discovered in the literature, many new validations made, and many new syntaxonomic concepts proposed in the course of the work of our team. Some of these syntaxa have already been published (Mucina et al. 2009; Bergmeier et al. 2011; Lysenko et al. 2011; Belonovskaya et al. 2014; Didukh & Mucina 2014; Čarni & Mucina 2015; Chytrý et al. 2015; Lysenko & Mucina 2015; Willner et al. 2015; Daniëls

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et al. 2016) and many others, including large-scale syntaxonomic revisions, are pending publication. However, we trust that the new, nomenclaturally stable and scientifically robust vegetation system will not be viewed as an end point. Our EuroVegChecklist was compiled in a spirit of serving vegetation science and its users. It is our expectation that it will be further expanded, revised and made user-friendly, thereby facilitating public access to the ever- evolving names and concepts of syntaxa.

On problems of classification of thallophyte communities

Although the number of researchers participating in bryophyte and lichen phytosociology is limited, the current system of bryophyte and lichen syntaxa is detailed. The first descriptions of thallophyte communities were already summarized in early vegetation surveys (e.g. Gams 1927; Klika & Hadač 1944; Klika 1948). More recent overviews of non-vascular plant syntaxa have been published by von Hübschmann (1986), Marstaller (1993, 2006), Dierßen (2001) and Schlüsslmayr (2005) for bryophytes, and Klement (1955) and Wirth (1980, 1995) for lichens. Bryophytes and lichens were treated equally, and algae were also included in the ground-breaking work of Barkman (1958) on the thallophyte epiphytes in Europe. Important surveys of bryophyte and lichen communities together were published by Wilmanns (1962), Drehwald & Preising (1991), Drehwald (1993), von Brackel (1993) and Dierßen (1996). Most studies, however, dealt with either bryophytes or lichens. An excellent survey of siliceous rock lichen communities in Central Europe was published by Wirth (1972). Surveys of calcareous rock lichen communities were provided by Roux (1981) and Roux et al. (2009). Paus (1997) studied terricolous lichen communities of NW Europe and Bültmann (2005) of the Arctic. Our bibliographic files list more than 900 monographic treatments. While for both bryophyte and lichen vegetation at least two large-scale overviews and syntaxonomic surveys have been published, a pan-European integrated system has never before been attempted.

The preparation of EVC2 and EVC3 made it clear that the syntaxonomic system of the thallophyte communities of Europe is incomplete. Due to recent taxonomic refinements of species concepts of lichens, it is possible, that good character species have not been recorded in any plots. An important future task will be combining bryophyte and lichen (and algal) communities into one consistent syntaxonomic system. Unfortunately, available relevé data are often insufficient because they often include only lichens or only mosses.

We can summarize that the communities dominated by thallophytes have been and still are recognized as floristically and ecologically distinct units. A specific characteristic is their occurrence in mostly azonal habitats, except in the more marginal regions or habitats such as the Arctic polar desert. The grouping of the syntaxa as used in EVC2 and EVC3 does not follow the logic of zonality, but rather physico-chemical properties of substrate or the water availability and microclimate. For further details of this approach see Bültmann (2012).

Perspectives on the practical applications

The EuroVegChecklist is an important tool for European nature conservation. The European network of protected areas, Natura 2000, has been based on the Natural Habitat Types of Community Interest listed in Annex I of the Habitats Directive (92/43/EEC). Most of these habitat types were defined based on vegetation syntaxa, although in the absence of a unified European syntaxonomic system (European Commission 2013). This led to inconsistencies (e.g. divergent interpretations of the same habitat type in different countries), which were often translated to national legislation (Evans 2010). For the first time, EuroVegChecklist provides a solid common currency to which all the national concepts can be cross-walked (Jiménez-Alfaro et al. 2014a), thereby enabling uniform interpretation of habitat types across the continent. European institutions such as the European Commission and European Environment Agency have recently initiated projects that would underpin the European habitat classification schemes by application of the syntaxonomic system of the EuroVegChecklist, including the revision of the EUNIS system of European habitat types (Schaminée et al. 2012), the Red List of European habitats project (Rodwell et al. 2013) and the project on distribution maps of the EUNIS habitats (Schaminée et al. 2014).

Another significant initiative related to the EuroVegChecklist is the development of data infrastructure for basic and applied ecological research. The European Vegetation Archive (EVA; see Chytrý et al. 2016) is a huge database of more than one million vegetation plots from across the continent. However, the full use of these data is only possible if they are classified in a consistent way, for which EuroVegChecklist provides an obvious tool. Conversely, EVA provides data for projects focusing on revision of classification of certain vegetation types based on solid analysis, and the results of those projects will be fed back to improve the classification system of EuroVegChecklist in the future.

Outlook

We hope that the publication of EuroVegChecklist will stimulate discussion about the meaning and value of the

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classification and its individual syntaxa, which will facilitate continuous improvement of this system. We are aware of the weaknesses of the classification and take full responsibility for what must necessarily be considered a first approximation. We envisage that it will herald a new phase of intensive research, striving towards understanding of both the ecological and evolutionary assembly processes shaping vegetation patterns at larger geographic scales, focusing on syntheses aimed at clarifying the 'black spots' of the system, and seeking new ways to make an impact on management of resources and nature conservation.

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Appendix 1

Euro-VegChecklist 1 (EVC1): Conspectus of the high-rank syntaxa of the European vegetation dominated by vascular plants.

We shall use the following abbreviations and conventions:

Distinction between authors carrying the same surname:

If not specified by an initial of the first name, the following rules apply: Géhu stands for Jean-Marie Géhu; Lakušić stands for Radomir Lakušić; Pignatti stands for Sandro Pignatti; Tx. stands for Reinhold Tüxen.

The following authors' names are abbreviated:

Bal.-Tul. stands for Emilie Balátová-Tuláčková; Br.-Bl. stands for Josias Braun-Blanquet; G. Br.-Bl. stands for Gabrielle Braun-Blanquet; J. Tx. stands for Jes Tüxen; Oberd. stands for Erich Oberdorfer; Rivas-Mart. stands for Salvador Rivas-Martínez.

Abbreviations pertaining to the nomenclatural status of the names and synonyms:

corr.: When the name of a syntaxon is based on a taxon that has been misidentified (either by an error of identification or by a misapplication in the identification literature used), then the name of the syntaxon must be corrected. A misidentification occurs also in the case when a narrower defined taxon can be used instead of the name of the aggregate that was originally used. The correction is indicated by adding the abbreviation 'corr.' *(correxit)* after the original author citation, followed by the correcting author and the year of the effective publication of the correction (ICPN arts. 43 & 48c).

corresp.: corresponding name; those names listed in the synonymy that cannot be considered true synonyms since their rank does not correspond to the rank of the correct name.

Example: '*Abieti-Piceion excelsae* Br.-Bl. in Br.-Bl. et al. 1939 (corresp.; as suballiance)' is a corresponding name of the *Abieti-Piceion excelsae* (Br.-Bl. in Br.-Bl. et al. 1939) Soó 1940 – the former name is a suballiance, while the latter is an alliance.

corr. illeg.: illegitimate *nomen corrigendum*. The name of the syntaxon has been corrected but the correction is not allowed and thus it is illegitimate (ICPN arts. 29a, 30 & 40) or because the Recommendation 10C cannot be applied [= ICPN art. 40]

corr. superfl.: superfluous correction of the name. The correction that has been made was not necessary for diverse reasons, e.g. (1) the correction was already made, (2) the name of the syntaxon that is corrected is invalidly published, (3) the name of the syntaxon that is corrected is illegitimate or is considered an ambiguous or a dubious name, hence there is no reason to correct it, (4) the taxon used for the correction appears to be a synonym of the corrected taxon.

invers. illeg.: illegitimate *nomen inversum*. The inversion of the name of a syntaxon has been made without it having been accepted by the Nomenclatural Commission (ICPN art. 42).

invers. superfl.: superfluous inversion of a name. An inversion of a name applying to an invalidly published name (ICPN art. 2b).

mut. illeg.: illegitimate *nomen mutatum*. The change of the name of a syntaxon has been made without it having been accepted by the Nomenclatural Commission (ICPN arts. 30 & 45).

mut. superfl.: superfluous mutation of the name. A mutation of a name applying to an invalidly published name (arts. 2, 3) or to an illegitimate name (ICPN arts. 29, 31, 34, 36).

nom. conserv. propos.: *nomen conservandum propositum*. A proposal to conserve a syntaxon name that has been validly published against an earlier name that would have a priority status (ICPN art. 52 and Recommendation 52A).

nom. corr.: *nomen corrigendum*. The name of a syntaxon, as originally published, has been corrected for a nomenclatural reason related to the taxa. This occurs when the taxon used in the formation of the name is a later, illegitimate homonym. In this case, a non-homonymous name of the taxon is to be used to correct the name of the syntaxon, and the correction is indicated by adding 'nom. corr.' after the authority of the name (ICPN arts. 44 & 48d).

nom. inval. ad interim: *nomen invalidum ad interim*. A name invalid according to the current (3rd) edition of the ICPN (Weber et al. 2000) that would become valid as soon as that edition is replaced by the upcoming edition of the ICPN. The 4th edition of the ICPN will include a retroactive change, that consider a table of more than three relevés with presence/absence data as a sufficient diagnosis of associations described before 1.1.1979.

nom. invers. propos.: *nomen inversum propositum*. A proposal to inverse a syntaxon name, i.e. to change the order of the two name-giving taxa as they were used in the original publication of the name in order to follow the rule that if one is dominant or belongs to the highest stratum, then it appears at the second place (ICPN arts. 10b & 42 and Recommendation 42A).

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nom. mut. propos.: *nomen mutatum propositum*. A proposal to change a syntaxon name in order to update it according to the contemporary taxonomic nomenclature. The change remains provisional until its approval by the Nomenclatural Commission (ICPN art. 45 and Recommendation 45A).

nom. rejic. ambig. propos.: *nomen rejiciendum ambiguum propositum*. A proposal to reject a syntaxon name because it is ambiguous, i.e. because the name in its current use is no more in accordance with its type, and if it would be used again according to its type it would be a permanent source of error (ambiguity). In such a case, the next later name available is to be adopted and if there is no such a name, a new name must be formed (ICPN art. 36).

phantom: The name of a syntaxon is ascribed to an author and a publication where this name does not occur at all (Examples 1 & 2). Here we also accommodate such names of syntaxa that have been published by the listed author, but with the wrong year according to their effective publication (Example 3).

Example 1: some literature source use the name '*Thero-Salicornietea strictae* Tx. 1954', yet there was no publication published effectively in 1954 by R. Tüxen which would have contained that name; this name most probably refers to the '*Thero-Salicornietalia strictae* Tx. in Tx. et Oberd. 1958' that was published effectively in (Tüxen & Oberdorfer 1958) and was based on an excursion to Spain that took place in 1954.

Example 2: *Puccinellietea phryganodis* Hadač 1946; there is no such a name in Hadač (1946) or any other publication this authors might have published in 1946.

Example 3: *Helichrysetalia arenarii* de Foucault 1999 is a phantom since no such name was effectively published in 1999; it is obviously the *Helichrysetalia arenarii* de Foucault 2001; the date 1999 appears in the header of this particular paper, however it refers to the date of the symposium this paper was delivered at; the real publication date is 2001 when the proceedings of this symposium were effectively published (de Foucault 2001).

pseudonym: The name of a syntaxon is used by later author(s) in a misinterpreted sense with respect to its original syntaxonomic significance. The misinterpreted sense is indicated by '*sensu*' followed by the misinterpreting author (s) and then by 'non' followed by the author(s) of the original sense (Rec. 46J; see also Mucina 1993).

syntax. syn.: syntaxonomic synonym. This is the name of a syntaxon that is valid and legitimate and that is considered to correspond to the same syntaxon as another name of the same rank that is based on a different type (Definition X of the ICPN). According to the priority principle, in the EVC1, EVC2 or EVC3 the syntaxonomic synonyms are later names respectively to the name retained.

The meaning of the Codes following the synonyms:

The reason for placing a name into synonymy is coded by using reference to the article of the International Code of Phytosociological Nomenclature (ICPN; Weber et al. 2000).

Examples:

Calamagrostietalia arundinaceae Eggler 1952 (2b); '(2b)' indicates that the name is invalid by referring to the ICPN article 2b (*nomen nudum*);

Deschampsion caespitosae Borza 1934 (29c, 31); '(29c, 31)' indicates that the name is illegitimate by referring to the ICPN articles 29c and 31;

Adenostyletea Lakušić 1985 (phantom); '(phantom)' indicates that there was not such name published by R. Lakušić in 1985 (for the explanation of the term 'phantom' see above).

Abbreviations of the authors of Remarks:

AC Andraž Čarni; AS Ayzik Solomeshch; ASG Arnoldo Santos Guerra; DI Dmytro Iakushenko; EB Erwin Bergmeier; FD Fred Daniëls; HB Helga Bültmann; HW Heinrich Weber; JC Jorge Capelo: JD Jürgen Dengler; JP Jens Pallas; JPT Jean-Paul Theurillat; JS Joop Schaminée; KD Klaus Dierssen; KS Kateřina Šumberová; LM Ladislav Mucina; MC Milan Chytrý; MH Michal Hájek; MV Milan Valachovič; NE Nikolai Ermakov; PD Panayotis Dimopoulos; RDP Romeo Di Pietro; RG Rosario Gavilán García; TL Tatiana Lysenko: WW Wolfgang Willner; YD Yakiv Didukh

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ZONAL AND INTRAZONAL VEGETATION

VEGETATION OF THE ARCTIC ZONE

ZONAL VEGETATION OF POLAR DESERT AND TUNDRA

PAP *Drabo corymbosae-Papaveretea dahliani* Daniëls, Elvebakk et Matveyeva in Daniëls et al. 2016

Polar deserts of the Arctic zone of the Arctic Ocean archipelagos

pap01 This new class (for the protologue see Daniëls et al. 2016) represents the zonal vegetation of the polar desert zone delineated by Bay (1997: 685–696, Fig. 7) as the Subzone A, which is characterized by sparse vegetation of vascular plants, lack of woody plants, absence (unlike in tundra) of sedges (*Carex*), absence of bog mosses (*Sphagnum*), and a pronounced occurrence of other bryophytes as well as lichens and cyanobacteria. (FD)

- *Drabo-Papaveretea dahliani* Daniëls 2002 (2b, 5)
- *Drabo-Papaveretea dahliani* Daniëls et Wilhelm 2002 (2b, 5)
- *Drabo corymbosae-Papaveretea dahliani* Bültmann et Daniëls 2013 (2b, 5)

PAP-01 *Saxifrago oppositifoliae-Papaveretalia dahliani* Daniëls, Elvebakk et Matveyeva in Daniëls et al. 2016

Polar deserts of the Arctic zone of the Arctic Ocean archipelagos

- *Drabo-Papaveretalia dahliani* Daniëls 2002 (2b, 5)
- *Drabo-Papaveretalia dahliani* Daniëls et Wilhelm 2002 (2b, 5)

PAP-01A *Papaverion dahliani* Hofmann ex Daniëls, Elvebakk et Matveyeva in Daniëls et al. 2016

Polar deserts of the Arctic zone of the Arctic Ocean archipelagos

- *Papaverion dahliani* Hofmann 1968 (2b)
- *Papaverion dahliani* Hofmann ex Daniëls 2013 (2b, 5)

KOB *Carici rupestris-Kobresietea bellardii* Ohba 1974

Circum-arctic fellfield and dwarf-scrub graminoid tundra, and relict wind-exposed short grasslands on base-rich substrates in the alpine and subnival belts of the European boreal and nemoral mountain ranges

- *Kobresio-Elynetea* Oberd. 1957 (3b)
- *Saxifragetea flagellaris* Knapp 1957 (2b)
- *Carici rupestris-Elynetea* Ohba 1974 *nom. mut. propos.* (*mut.illeg.*)
- *Carici rupestris-Kobresietea myosuroidis* Ohba 1974 *nom. mut. propos.* (*mut.superfl.*)

kob01 Rivas-Martínez et al. (2002a: 253) published the formal proposal serving this name change. This proposal is irrelevant since the newest systematic studies in *Carex*

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(Global Carex Group 2015) show that *Kobresia* and *Carex* form a monophyletic group. (LM, JPT)
- *Kobresietea myosuroidis* Mirkin et al. 1983 (1)
- *Kobresietea myosuroidis* Mirkin et al. 1986 (syntax.syn.)
- *Carici bushiorum-Bromopsietalia variegatae* Tsepkova 1987 (2b, 5) (corresp.)

KOB-01 *Thymo arcticae-Kobresietalia bellardii* Ohba 1974

Graminoid tundra and dwarf-shrub fellfield vegetation of Scandinavia, Northern Russia, Iceland, the Arctic Ocean islands, Greenland and the Arctic North America
- *Elyno-Dryadetalia* Br.-Bl. 1948 (2b)

kob02 This name was suggested by Braun-Blanquet (1948: 163) in passing, when he commented on the similarity between the *Elynion medioeuropaeum* (*recte*: *Oxytropido-Elynion*) and the *'Elynion Bellardii'* – a unit invalidly described by Nordhagen (1937). The *Elyno-Dryadetalia* Br.-Bl. 1948 was described invalidly because the only alliance assigned by Braun-Blanquet (l.c.) to this order, the '*Elynion Bellardi* (Nordhagen)' has been invalidly described by then. (LM)
- *Dryadetalia octopetalae-integrifoliae* Barrett et Krajina in Barrett 1972 (1)
- *Kobresio-Dryadetalia* Br.-Bl. ex Ohba 1974 (2b)

kob03 Some authors consider the account published by Ohba (1974: 382–384), as validation of the invalidly described name *Kobresio-Dryadetalia*. However, none of the alliances ('*Kobresio-Dryadion* Nordhagen 1936, *Oxytropido nigrescentis all. nov. prov., Dryadion integrifoliae all. nov. prov., Carici elynoidis-Kobresion bellardii all. nov. prov.*') assigned to the *Kobresio-Dryadetalia* were valid at that time, hence the concept of the *Kobresio-Dryadetalia* was not effectively validated. (LM)
- *Salicetalia polaris* H. Hartmann 1980 (2b, 3b, 5)
- *Salicetalia polaris-arcticeae* H. Hartmann 1980 (2b, 3b, 5)

KOB-01A *Kobresio-Dryadion* Nordhagen 1943

Graminoid tundra and dwarf-scrub heath vegetation of Scotland, Scandinavia, Iceland and the Arctic Ocean islands
- *Caricion nardinae* Nordhagen 1935 (2b)

  kob04 A partial account of the turbulent nomenclatural history surrounding this unit is found in Rønning (1965: 12). (LM)
- *Caricion nardinae* Nordhagen 1936 (phantom)
- *Caricion nardinae* Nordhagen 1937 (2b)
- *Elynion bellardii boreoarcticum* Nordhagen 1936 (phantom)
- *Kobresio-Dryadion* Nordhagen 1936 (phantom)
- *Kobresion myosuroidis* Gams 1936 (2b)
- *Kobresion myosuroidis* Nordhagen 1936 *nom. mut. propos.* (*mut.superfl.*)
- *Potentillo-Polygonion vivipari* Nordhagen 1936 (phantom)
- *Elynion bellardii boreoarcticum* Nordhagen 1937 (2b)
- *Potentillo-Polygonion vivipari* Nordhagen 1937 (2b)
- *Dryadion octopetalae* Kalliola 1939 (2b)
- *Dryadion* Du Rietz 1942 (2b)
- *Dryadion octopetalae* Du Rietz ex Rønning 1965 (syntax.syn.)
- *Thymo arcticae-Kobresion bellardii* Ohba 1974 (syntax.syn.)
- *Potentillo-Polygonion vivipari* Nordhagen ex Dierßen 1992 (syntax.syn.)

KOB-01B *Dryado octopetalae-Caricion arctisibiricae* Koroleva et Kulyugina in Chytrý et al. 2015

Graminoid tundra and dwarf-scrub heath vegetation of Arctic Western Russia and Siberia
- *Carici arctisibiricae-Dryadion octopetalae* Koroleva et Kulyugina 2010 (2b, 3b, 5)
- *Carici arctisibiricae-Dryadion octopetalae* Koroleva et Kulyugina 2014 (2b, 5)

KOB-01C *Dryadion integrifoliae* Ohba ex Daniëls 1982

Graminoid tundra and dwarf-scrub heath vegetation of Greenland and the Arctic North America
- *Dryadion octopetalae* Barrett et Krajina in Barrett 1972 (1)
- *Dryadion integrifoliae* Ohba 1974 (2b, 3b)

KOB-02 *Oxytropido-Elynetalia* Albrecht 1969

Relict summit graminoid tundra in the alpine and subnival belts of the nemoral mountain ranges of the Pyrenees, the Alps, the Carpathians, the Apennines and the Balkans
- *Elynetalia myosuroidis* Oberd. 1957 (3b)
- *Kobresietalia myosuroidis* Oberd. 1957 *nom. mut. propos.* (3b, *mut.superfl.*)
- *kob05* Rivas-Martínez et al. (2002a: 265) published the formal proposal serving this name change. This proposal is irrelevant since the newest systematic studies in *Carex* (Global Carex Group 2015) show that *Kobresia* and *Carex* form a monophyletic group. (LM, JPT)
- *Oxytropido-Elynetalia* Oberd. 1957 (*sensu* Ohba 1974) (phantom)
- *Oxytropido-Kobresietalia* Oberd. 1957 *nom. mut. propos.* (phantom, *mut.superfl.*)
- *Oxytropido-Elynetalia* Oberd. 1962 (2b)
- *Oxytropido-Kobresietalia* Albrecht 1969 *nom. mut. propos.* (45)
- *Festucetalia versicoloris* Jeník in Moravec et al. 1995 (syntax.syn.)

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GROUP OF GRAMINOID TUNDRA ALLIANCES

KOB-02A *Oxytropido-Elynion myosuroidis* Br.-Bl. 1950

Summit graminoid tundra in the alpine and subnival belts of the Pyrenees, the Alps and the Carpathians

kob06 In part IV of the 'Übersicht der Pflanzengesellschaft Rätiens', Braun-Blanquet (1949c) published the name '*Oxytropido-Elynion* Br.-Bl. 1948', containing only one association – the '*Elynetum* (Brockmann-Jerosch) Br.-Bl. 1913' to which a proper reference was made in the protologue. However, the bibliographical references, gathered in part VI of the publication, were published as late as in 1950 (Braun-Blanquet 1950), and therefore the date of the valid publication of the name is 1950 and not 1949. In part IV in 1949, there is no citation of the name '*Elynion medioeuropaeum*' and, although Braun-Blanquet refers explicitly to his 'Vegetations-Monographie der Ostpyrenäen (1948)' in the text, there is no effective bibliographical reference to Braun-Blanquet (1948) either directly in the text or in the bibliography published in 1950. As a result, the name '*Oxytropido-Elynion*' cannot be considered as an explicit substitution of the illegitimate '*Elynion medioeuropaeum*' by Braun-Blanquet (1948), and the correct citation of the name is *Oxytropido-Elynion* Br.-Bl. 1950. (JPT)

- *Elynion* Gams 1936 (2b)
- *Elynion medioeuropeum* Br.-Bl. 1948 (34a)
- *Oxytropido-Kobresion* Br.-Bl. (1948) 1949 (phantom)

kob07 Rivas-Martínez et al. (2002a: 270) published a formal proposal serving this name change. This proposal is irrelevant since the newest systematic studies in *Carex* (Global Carex Group 2015) show that *Kobresia* and *Carex* form a monophyletic group that might lead to sinking of *Kobresia* into synonymy of *Carex*. (LM, JPT)

- *Oxytropido-Elynion myosuroidis* Br.-Bl. 1949 (phantom)
- *Oxytropido-Kobresion myosuroidis* Br.-Bl. 1950 *nom. mut. propos.* (*mut.superfl.*)
- *Elynion medioeuropeum* Br.-Bl. 1954 (31, 34a)

KOB-02B *Leontopodio nivalis-Elynion myosuroidis* (Blasi et al. 2003) Di Pietro et Mucina in Chytrý et al. 2015

Summit graminoid tundra in the alpine and subnival belts of the Apennines and the Balkans

GROUP OF TUSSOCK GRASSLAND ALLIANCES

KOB-02C *Festucion versicoloris* Krajina 1933

Alpine tussock grasslands on mylonites of the Western Carpathians

- *Festucion versicoloris* Krajina 1934 (phantom)

KOB-02D *Agrostion alpinae* Jeník et al. 1980

Subalpine tussock grasslands on steep or terraced slopes on base-rich substrates of the Eastern Hercynicum

kob08 Kočí (in Chytrý 2007: 84) classified this alliance into the *Elyno-Seslerietea*, with reservations. (LM)

KOB-03 *Kobresietalia capilliformis* Tsepkova 1987

Chionophobous summit graminoid and dwarf-scrub mountain tundra in the alpine and subnival belts of the Caucasus

- *Dryadetalia caucasicae* Ohba 1974 (2b)

kob09 This name was suggested by Ohba (1974) in original form as 'Ordnung von *Dryas octopetala* ssp. *caucasica*' (a name that was obviously coined on basis of *Dryas caucasica* Juz., today considered a synonym of *Dryas octopetala* L.) and documented in Tab. 24, only by a single synoptic column that has not been assigned either to a validly described association nor to a validly described alliance. (LM)

KOB-03A *Kobresion capilliformis* Tsepkova 1987

Chionophobous summit graminoid mountain tundra in the alpine and subnival belts of the Caucasus

kob10 Onipchenko (2002) did not accept both the *Kobresion capilliformis* Tsepkova 1987 and the *Kobresietalia capilliformis* Tsepkova 1987 and included the *Alchemillo-Kobresietum capilliformis* Tsepkova 1987 in the *Oxytropido-Elynion* Br.-Bl. 1949 (*Oxytropido-Kobresietalia, Carici rupestris-Kobresietea bellardii*). (NE)

KOB-03B *Salici kazbekensis-Empetrion nigrae* Onipchenko 2002

Chionophobous summit ericoid dwarf-heath mountain tundra in the alpine and subnival belts of the Caucasus

LOI *Loiseleurio procumbentis-Vaccinietea* Eggler ex Schubert 1960

Arctic-boreal tundra scrub and relict alpine acidophilous dwarf-heath mountain tundra of Eurasia and North America

loi01 This class comprises primary dwarf heath (tundra and European mountain tundra) composed of arctic and arctic-alpine elements. The *Calluno-Ulicetea*, on the other hand, comprises primary (and secondary) heath of low altitudes or secondary heath of the montane to subalpine belt replacing original coniferous forests. (LM)

- *Loiseleurio-Vaccinietea* Eggler 1952 (2b)
- *Cetrario-Loiseleurietea* Suzuki et Umezu in Suzuki 1964 (syntax.syn.)
- *Rhodoreto-Vaccinietea* Lakušić et al. 1979 (orig.form) (2b, 5)
- *Betuletea rotundifoliae* Mirkin et al. 1983 (1)
- *Betuletea rotundifoliae* Mirkin 1985 (2b)
- *Calluno-Vaccinietea myrtilli* de Foucault 1991 (29)

loi02 According to the list of References, de Foucault (1991: 173) was aware of the Schubert's (1960) work, where the latter author validated the *Loiseleurio procumbentis-Vaccinietea* and also described the *Empetretalia hermaphroditi*. Since the latter order was assigned as the *typus* of the

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'*Calluno-Vaccinietea myrtilli*', this class name became a *nomen superfluum* of the *Loiseleurio procumbentis-Vaccinietea*. (LM)

- *Vaccinietea myrtilli* de Foucault 1991 (2b, 5)
- *Betuletea rotundifoliae* Mirkin ex Chytrý et al. 1993 (syntax.syn.)

loi03 The *Betuletea rotundifoliae* is recognized by several researchers as class in its own right. Ermakov and Cherosov (2005), however, prefer to classify these communities within the *Loiseleurio-Vaccinietea*. (LM)

LOI-01 *Rhododendro ferruginei-Vaccinietalia* Br.-Bl. in Br.-Bl. et Jenny 1926

Relic acidophilous dwarf-heath mountain tundra in the subalpine and alpine belts of the nemoral mountain ranges of Western, Central and Southern Europe, and the Caucasus

loi04 The order is validly published with the *Loiseleurio-Vaccinion* Br.-Bl. in Br.-Bl. et Jenny 1926 as its *typus*. Therefore, if the *Loiseleurio-Vaccinion* Br.-Bl. in Br.-Bl. et Jenny 1926 were to be placed in another order, then ICPN art. 29c would apply and the other order would become a *nomen superfluum,* because the earliest name *Rhododendro-Vaccinietalia* would always have the priority. This would apply also if the type of the alliance, the *Empetro-Vaccinietum* Br.-Bl. in Br.-Bl. et Jenny 1926, were placed in another order. (JPT)

- *Rhodoretalia* G. Br.-Bl. et Br.-Bl. in G. Br.-Bl. 1931 (29c)

loi05 The original diagnosis of the order '*Rhodoretalia*' contains two alliances, the '*Loiseleurieto-Vaccinion*' and the '*Rhodoreto-Vaccinion*'. It is important to determine if the diagnosis of the alliance '*Loiseleurieto-Vaccinion*' refers to Braun-Blanquet & Jenny (1926) or not (see under *Loiseleurio-Vaccinion*). (A) If the '*Loiseleurieto-Vaccinion*' is considered to refer to the *Loiseleurio-Vaccinion* Br.-Bl. in Br.-Bl. et Jenny 1926, then the order name '*Rhodoretalia*' includes the type of the order *Rhododendro-Vaccinietalia* Br.-Bl. in Br.-Bl. et Jenny 1926 and is a *nomen superfluum* (ICPN art. 29c). (B) If the '*Loiseleurieto-Vaccinion*; is not considered to refer to the *Loiseleurio-Vaccinion* Br.-Bl. in Br.-Bl. et Jenny 1926, then the order name '*Rhodoretalia*' is a syntaxonomic synonym of the order *Rhododendro-Vaccinietalia* Br.-Bl. in Br.-Bl. et Jenny 1926. (JPT)

- *Loiseleurio-Vaccinietalia* Eggler 1952 (2b)
- *Empetretalia hermaphroditi* Schubert 1960 (syntax.syn.)
- *Cetrario-Loiseleurietalia* Suzuki 1964 *nom. invers. propos.* (2b, *invers.superfl.*)
- *Loiseleurio-Cetrarietalia* Suzuki 1964 (2b)
- *Loiseleurio-Cetrarietalia* Suzuki et Umezu 1965 (2b)
- *Vaccinietalia* Lakušić et al. 1978 (phantom)
- *Rhodoreto-Vaccinietalia* Lakušić et al. 1979 (orig.form) (2b, 5)
- *Vaccinietalia* Lakušić et al. 1979 (2b, 5)
- *Rhododendro-Vaccinietalia* Rameau in Bensettiti et al. 2001 (2b)

LOI-01A *Loiseleurio procumbentis-Vaccinion* Br.-Bl. in Br.-Bl. et Jenny 1926

Relic alpine silicicolous dwarf heath in wind-exposed habitats of the nemoral mountain ranges of Europe

- *Loiseleurio-Vaccinion* G. Br.-Bl. et Br.-Bl. in G. Br.-Bl. 1931 (31)
- *Loiseleurio-Vaccinion uliginosi* Krajina 1933 (31)
- *Loiseleurio-Vaccinion* Br.-Bl. in Br.-Bl. et al.1939 (31)
- *Cetrario-Loiseleurion* (Br.-Bl. in Br.-Bl. et al. 1939) Schubert 1960 (syntax.syn.)

LOI-01B *Rhododendro ferruginei-Vaccinion* Br.-Bl. ex Schnyder 1930

Relic subalpine and alpine silicicolous chionophilous low heath of the Alps

- *Rhododendro ferruginei-Vaccinion* Br.-Bl. in Br.-Bl. et Jenny 1926 (2b)
- *Rhodoreto-Vaccinion* de Soó 1929 (orig.form) (2b)
- *Rhododendro ferruginei-Vaccinion* G. Br.-Bl. et Br.-Bl. in G. Br.-Bl. 1931 (31)
- *Rhodoro-Vaccinion* Runge 1986 (orig.form) (phantom)

LOI-01C *Vaccinion myrtilli* Krajina 1933

Relic subalpine and alpine silicicolous chionophilous dwarf heath of the Western Carpathians

loi06 Šibík et al. (2007; see also Kliment & Valachovič 2007) amended the original concept of Krajina (1933), by excluding the *Pinus mugo* krummholz and typifying the alliance by choosing the *Vaccinietum myrtilli tatricum* Szafer et al. 1927 as the *lectotypus.* (LM)

- *Vaccinion myrtilli* Krajina 1934 (phantom)
- *Melampyro-Vaccinion* Jeník et al. 1980 (syntax.syn.)

LOI-01D *Rhododendrion myrtifolii* de Foucault ex Theurillat et Mucina *all. nov. hoc loco*

Relic subalpine and alpine acidophilous chionophilous dwarf heath of the Eastern and Southern Carpathians

loi07 The invalid '*Rhododendrion kotschyi* de Foucault 1991' (de Foucault 1991: 163), is validated here: *Rhododendrion myrtifolii* de Foucault ex Theurillat et Mucina *all. nov. hoc loco*. The *holotypus* (*hoc loco*) is the *Junco trifidi-Rhododendretum kotschyi* Resmeriță 1978 (original name: '*Rhodoreto-Juncetum trifidi* Resmeriță 1975'). The name of the association was published at first as a *nomen nudum* in Resmeriță (1975: 345). Then the name was incidentally validly published on p. 370 in Resmeriță (1978). The diagnostic taxa of the new alliance are *Rhododendron myrtifolium, Potentilla aurea* subsp. *chrysocraspeda* and *Soldanella majo*r. (JPT)

- *Vaccinion uliginosi* Lakušić 1974 (phantom)
- *Vaccinion uliginosi* Lakušić et al. 1979 (2b)
- *Rhododendrion kotschyi* de Foucault 1991 (5, 8)

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LOI-01E *Rhododendrion caucasici* Onipchenko 2002

Rhododendron-dominated ericoid chionophilous low scrub of the Caucasus

- *Vaccinio myrtilli-Rhododendrion caucasici* Vural 1996 *nom. dubium* (38)

LOI-02 *Vaccinio microphylli-Juniperetalia nanae* Rivas-Mart. et M. Costa 1998

Subxeric and subthermophilous low juniper scrub in the supramontane to subalpine belts of Southern Europe and the Caucasus

- *Vaccinio microphylli-Juniperetalia alpinae* Rivas-Mart. et M. Costa 1998 *nom. mut. propos.* (45)

loi08 Rivas-Martínez et al. (2011: 479) suggested the mutation of the syntaxon name. This appears superfluous and illegitimate however, because of the synonym status of the original name, as well as the fact that *Juniperus communis* subsp. *nana* is still currently in use. (LM)

- *Juniperetalia nanae* Rameau in Bensettiti et al. 2001 (syntax.syn.)

LOI-02A *Juniperion nanae* Br.-Bl. in Br.-Bl. et al. 1939

Subalpine chionophobous silicicolous low juniper scrub of the nemoral mountain ranges of Europe

- *Juniperion alpinae* Br.-Bl. in Br.-Bl. et al. 1939 *nom. mut. propos.* (45)

loi09 The proposal to mutate the name was published by Rivas-Martínez et al. (2011: 265, 478). (LM)

- *Juniperion sibiricae* Br.-Bl. in Br.-Bl. et al. 1939 *nom. mut. propos.* (45)
- *Pino-Junipero-Cytision* Barbero et Quézel 1975 (phantom)
- *Pino-Junipero-Cytision* Barbero et Quézel 1976 (10a)
- *Pino uncinati-Rosion pimpinellifoliae* (Barbero et Quézel 1975) Quézel et Barbero 1990 (syntax.syn.)

LOI-02B *Daphno oleoidis-Juniperion alpinae* Stanisci 1997

Subalpine and supramontane chionophobous calcicolous dry low juniper scrub of the Central and Southern Apennines

LOI-02C *Aconito nasuti-Juniperion communis* Onipchenko 2002

Subalpine chionophobous silicicolous low juniper scrub of the Caucausus

loi10 It appears that the eponymous taxon called '*Juniperus communis*' by Onipchenko (2002) is the local endemic *Juniperus communis* subsp. *oblonga* (M. Bieb.) Galushko (considered as a variety by Hantemirova et al. 2012). (LM)

LOI-03 *Deschampsio flexuosae-Vaccinietalia myrtilli* Dahl 1957

Zonal arctic and montane boreo-arctic acidophilous dwarf heath of Scandinavia, northern Eurasia, Arctic Ocean archipelagos and North America

loi11 As documented by the synoptic table of de Foucault (1991: 155), there is a marked difference between the relict *Vaccinium* heath of the European nemoral mountains, and analogous communities found in boreo-atlantic Great Britain, Scandinavia, Northern Russia and the Arctic Ocean islands. The latter are featured in the synoptic table as columns 12 through 15 and show an absence of *Rhododendron* species and presence of arctic elements such as *Betula nana, Carex bigelowii, Diapsensia lapponica, Lycopodium alpinum* and *Phyllodoce caerulea*. This group of communities is here classified as the *Deschampsio-Vaccinietalia myrtilli*, comprising two alliances – the *Loiseleurio-Arctostaphylion* and the *Phyllodoco-Vaccinion*. (LM) FD does not support the concept of this order and prefers classifying this vegetation within the *Rhododendro-Vaccinietalia*.

- *Deschampsio-Myrtilletalia* Dahl 1957 (orig.form)

LOI-03A *Loiseleurio-Arctostaphylion* Kalliola ex Nordhagen 1943

Arctic and boreo-alpine tundra scrub in wind-exposed habitats of Scandinavia, Northern Russia, Svalbard, Iceland and Greenland

loi12 Nordhagen's name has the priority over the *Loiseleurio-Diapension lapponicae* Daniëls 1982 which is a syntaxonomic synonym since the original diagnosis of Daniëls' (1982) alliance includes many elements of the original diagnosis of Nordhagen's alliance, through the inclusion of the elements of the invalidly published suballiance of the *Loiseleurio-Diapensenion* Br.-Bl. et al. 1939 that are also included in the *Loiseleurio-Arctostaphylion* Kalliola ex Nordhagen 1943. (JPT) For the relationship of this unit and the *Loiseleurio-Vaccinion* see Hadač (1972: 357). (LM)

- *Juncion trifidi scandinavicum* Nordhagen 1936 (phantom)
- *Juncion trifidi scandinavicum* Nordhagen 1937 (2b)
- *Loiseleurio-Vaccinion uliginosi* Nordhagen 1936 (phantom)
- *Loiseleurio-Vaccinion uliginosi* Nordhagen 1937 (2b)
- *Loiseleurio-Arctostaphylion* Kalliola 1939 (2b)

loi13 Kalliola (1939) follows the Scandinavian School and included only sociations in the alliance. (JPT)

- *Juncion trifidi scandinavicum* Nordhagen 1943 (34a)
- *Arctostaphylo-Cetrarion nivalis* Dahl 1957 (29c)

loi14 The *Arctostaphylo-Cetrarion nivalis* (Dahl 1957) is a superfluous name for the *Loiseleurio-Arctostaphylion* Nordhagen 1943 because although Dahl (l.c.) was following the Scandinavian school and uses sociations, he included in the synonymy the Nordhagen's alliance. Syntaxonomically, the *Arctostaphylo-Cetrarion nivalis* Dahl 1957 contains chionophobous communities of both dwarf shrubs heaths of the *Loiseleurio-Arctostaphylion* Nordhagen 1943 and some grasslands of the '*Juncion trifidi scandinavicum* Nordhagen 1943'. (JPT)

- *Loiseleurio-Cetrarion* Suzuki-Tokio et Umezu in Suzuki-Tokio 1964 (phantom)
- *Cetrario-Loiseleurion* Suzuki-Tokio et Umezu in Suzuki-Tokio 1964 (phantom)
- *Loiseleurio-Diapension lapponicae* Daniëls 1982 (syntax.syn.)

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loi15 The name of the alliance is validly published, but since the suballiance *Loiseleurio-Diapensenion* Braun-Blanquet, Sissingh et Vlieger 1939 was invalidly published (ICPN art. 3b), the correct citation of the name reads '*Loiseleurio-Diapension* Daniëls 1982'. Syntaxonomically it is a later synonym of the *Loiseleurio-Arctostaphylion* Kalliola ex Nordhagen 1943. (JPT)

LOI-03B *Phyllodoco-Vaccinion myrtilli* Nordhagen 1943

Moderately chionophilous dwarf scrub of the boreal and hemiarctic zones of Fennoscandia, Iceland, Northern Russia and Greenland

loi16 The name '*Phyllodoco-Vaccinion myrtilli'* is invalidly published in Nordhagen (1937) because there are only sociations in the original diagnosis of the alliance. The name is validly published in Nordhagen (1943). (JPT)

- *Phyllodoco-Vaccinion myrtilli* Nordhagen 1936 (phantom)
- *Phyllodoco-Vaccinion myrtilli* Nordhagen 1937 (2b)
- *Phyllodoceto-myrtilli* Kalliola 1939 (orig.form) (2b)
- *Myrtillion alpinum* Du Rietz 1942 (orig.form) (2b)
- *Myrtillion subalpinum* Du Rietz 1942 (orig.form) (2b)

INTRAZONAL VEGETATION OF POLAR DESERT AND TUNDRA

SAX *Saxifrago tricuspidatae-Calamagrostietea purpurascentis* Drees et Daniëls 2009

Cryo-xerophytic steppe and associated scrub on base-rich and (sub)saline substrates in continental Greenland and North America

- *Calamagrostietea purpurascentis* Daniëls et al. 2000 (2b)
- *Calamagrostietea purpurascentis* Daniëls et Wilhelm 2002 (2b, 3b)

SAX-01 *Saxifrago tricuspidatae-Calamagrostietalia purpurascentis* Drees et Daniëls 2009

Cryo-xerophytic steppe and associated scrub on base-rich and (sub)saline substrates in continental Greenland and North America

SAX-01A *Saxifrago tricuspidatae-Calamagrostion purpurascentis* Cooper ex Drees et Daniëls 2009

Cryo-xerophytic steppe and associated scrub on base-rich substrates in continental Greenland and North America

- *Saxifrago tricuspidatae-Calamagrostion purpurascentis* Cooper 1986

SAX-01B *Puccinellion nuttallianae* Daniëls in Chytrý et al. 2015

Low Arctic (sub)saline steppe vegetation on loess and clayey sediments in Greenland

- *Gentiano-Puccinellion deschampsioidis* Daniëls et Wilhelm 2002 (2b, 5)

COC *Saxifrago cernuae-Cochlearietea groenlandicae* Mucina et Daniëls *class. nov. hoc loco*

Vegetation of open grassy tundra disturbed by zoo-anthropogenic activities and cryoturbation in Svalbard and Greenland

coc01 Here we formally describe this new class by assigning the *Phippsio-Cochleariopsietalia groenlandicae* (Hadač 1989: 165–167) as the *holotypus (hoc loco)* of the class. This class unites vegetation disturbed (especially by anthropogenic and zoogenic influence) habitats of the arctic zone of the Palearctis. Its ecology, distribution, and delimitations towards other arctic vegetation classes will be handled elsewhere. The diagnostic taxa of the new class are: *Cerastium arcticum, Cochlearia groenlandica, Draba alpina, D. corymbosa, Luzula confusa, Papaver radicatum, Phippsia algida* subsp. *concinna, Potentilla hyparctica, Saxifraga cernua, S. cespitosa, S. flagellaris, S. oppositifolia* subsp. *oppositifolia, S. rivularis, Stellaria crassipes, Poa alpina* and *Puccinellia angustata.* For other species see the profile of the class in the EuroVeg-Browser accompanying this paper. (LM, FD)

COC-01 *Phippsio-Cochleariopsietalia groenlandicae* Hadač 1989

Vegetation of open grassy tundra disturbed by zoo-anthropogenic activities and cryoturbation in Svalbard and Greenland

coc02 Theurillat & Moravec (1992) suggested that the name *Phippsio-Cochleariopsietalia* (Hadač 1989) was invalidly published (ICPN art. 8), because the character species given by Hadač (l.c.) were indicated provisionally. However, the formulation used by Hadač "The association, alliance and order may be characterized by *Puccinellia angustata* and *Cochleariopsis groenlandica*. . ." has to be considered as a literary form, and hence not as a provisional indication. In that case the art. 8 would not apply, and the name *Phippsio-Cochleariopsietalia* should be considered as validly published by Hadač (1989). A preliminary syntaxonomic analysis (Ermakov & Mucina in prep.), suggests that the classes *Saxifrago cernuae-Cochleariopsietea groenlandicae* and the *Matricario-Poetea arcticae* Ishbirdin in Sumina 2012 do share some of the species pool, however they remain biogeographically and ecologically very distant. It is therefore the classification of the *Phippsio-Cochleariopsietalia groenlandicae* Hadač 1989 within the latter class, as suggested by some authors, is not appropriate. (LM, JPT)

COC-01A *Cochleariopsion groenlandicae* Hadač 1989

Vegetation of anthropogenic disturbed habitats in Svalbard and Greenland

COC-01B *Cerastio arctici-Saxifragion cernuae* H. Hartmann ex Mucina et Daniëls *all. nov. hoc loco*

Vegetation of bird-manured and disturbed cliff habitats in Svalbard

coc03 Hartmann (1980: 114, 118) provisionally described the alliance *'Cerastio-Saxifragion cernuae'* (ICPN art. 3b)

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containing a '*Poa alpigena-Alopecurus alpinus*-Gesellschaft' and a community with *Poa pratensis* and *Festuca rubra*. Hadač (1989: 146) published validly the former community as an association, the '*Poo alpigenae-Alopecuretum alpini* Hartm. ex Hadač 1989' by choosing one relevé in Hartmann's table as the type. He also designated the latter association as the type of the alliance '*Cerastio-Saxifragion cernuae* Hartmann 1980' and indicated three species characterizing the alliance. Seemingly, Hadač in so doing incidentally validated Hartmann's provisional name in providing all the needed elements. However, Hadač did not specify which species of the genus *Cerastium* is eponymous of the name of the alliance and Hartmann (l.c., in his table) did not differentiate *C. arcticum* from *C. alpinum* (ICPN art. 3g). Therefore, no incidental validation of the alliance occurred in Hadač (l.c.). Here, we validate the Hartmann's name by providing the missing condition in choosing *C. arcticum* as the name-giving taxon: *Cerastio arctici-Saxifragion cernuae* H. Hartmann ex Mucina et Daniëls *all. nov. hoc loco*; *holotypus (hoc loco)*: *Poo alpigenae-Alopecuretum alpini* H. Hartmann ex Hadač 1989. The regional character species of the alliance are: *Alopecurus magellanicus (*syn. *A. alpinus* Sm.*), Cerastium arcticum, Poa alpigena, Saxifraga cernua, S. cespitosa* and *S. hyperborea*. (LM, FD, JPT) We suggest that the *Cerastio-Saxifragion cernuae* is conceptually different from the *Cochleariopsion groenlandicae* Hadač 1989. (LM, FD)

- *Cerastio arctici-Saxifragion cernuae* H. Hartmann 1980 (2b, 3b, 5)

VEGETATION OF THE BOREAL AND HEMIBOREAL ZONES

ZONAL BOREAL AND HEMIBOREAL FORESTS

PIC *Vaccinio-Piceetea* Br.-Bl. in Br.-Bl. et al. 1939

Holarctic coniferous and boreo-subarctic birch forests on oligotrophic and leached soils in the boreal zone and at high-altitudes of mountains in the nemoral zone of Eurasia

pic01 The class in this syntaxonomic circumscription, includes also the wooded bogs classified by some (e.g. Stortelder et al. 1999a, 1999b; Berg et al. 2004) within the *Vaccinio uliginosi-Pinetea* Passarge 1968. (LM) The placement of the wooded bogs within the *Vaccinio-Piceetea* is justified because they often occur on a thin layer of peat with trees rooted in the mineral soil. The species composition also comprises many species of typical boreal coniferous forests. (MC) The *Vaccinio uliginosi-Pinetea* does not have its own character species, and the physiognomic differences from the *Vaccinio-Piceetea* are small. These are bogs with only scattered or low-grown trees with undergrowth that does not differ from the *Oxycocco-Sphagnetea*. (MH) The classification of this vegetation within the *Vaccinio-Piceetea* should be seen as a compromise. (LM) For the nomenclature related to the name see Willner et al. (2015). (WW, LM, JPT)

- *Betulo-Pinetea* Preising et Knapp 1942 (1)
- *Betulo-Pinetea* Preising 1944 (1)
- *Piceetea excelsae* Klika in Klika et Hadač 1944 (2b)
- *Piceetea excelsae* Klika 1948 (syntax.syn.)
- *Vaccinietea uliginosi* Lohmeyer et Tx. in Tx. 1955 p.p. (2b)
- *Dicrano-Pinetea sylvestris* F.-K. Hartmann 1957 (syntax.syn.)
- *Betulo-Pinetea* Preising et Knapp in Scamoni et Passarge 1959 (syntax.syn.)

pic02 Herewith I select the *Vaccinio-Pinetalia* Scamoni et Passarge 1959 (Scamoni & Passarge 1959: 393) as the *lectotypus (hoc loco)* of this class name. (LM)

- *Vaccinio uliginosi-Pinetea* Passarge 1968 (syntax.syn.)
- *Vaccinio uliginosi-Pinetea* Passarge in Passarge et G. Hofmann 1968 (31)
- *Piceetea* Lakušić et al. 1979 (2b, 5)
- *Uliginosi-Betulo-Pinetea* Scamoni 1985 p.p. (orig.form) (34)
- *Abieti-Piceetea* (Lakušić et al. 1979) Lakušić et Redžić 1988 (5)
- *Pino cembrae-Piceetea abietis* Julve 1993 (2b)
- *Milio-Abietea* Vorobyov 2014 (orig.form) (2b, 5)
- *Milio-Abietea* Lashchinskii 2014 (orig.form) (2b, 3b, 5)
- *Milio-Abietetea* Zhitlukhina ex Lashchinskii et Korolyuk 2015 (orig.form) (5)

pic03 This class was invalidly published because the *Carici macrourae-Abietetalia sibiricae* (the *typus* of the class as designated by Lashchinskii & Korolyuk 2015) was invalidly published as well (see also Remark *pic07*). (WW)

PIC-01 *Piceetalia excelsae* Pawłowski et al. 1928

European boreo-montane and subalpine spruce and pine forests on nutrient-poor soils

- *Piceetalia abietis* Pawłowski et al. 1928 *nom. mut. propos.* (45)

pic04 This form of the name has been used for instance by Rivas-Martínez et al. (2011: 389). (LM)

- *Cembretalia* Rübel 1933 (orig.form) (2b)
- *Vaccinio-Piceetalia excelsae* Br.-Bl. in Br.-Bl. et al. 1939 (syntax.syn.)
- *Betulo-Piceetalia excelsae* Knapp 1942 (1)
- *Betulo-Piceetalia excelsae* Preising 1944 (1)
- *Myrtillo-Piceetalia excelsae* Hadač 1962 (29)
- *Vaccinio-Abietetalia* Passarge 1968 (Regionalordnung) (3d)
- *Piceetalia* Lakušić et al. 1979 (2b, 5)
- *Abieti-Piceetalia excelsae* Lakušić 1982 (2b, 5)
- *Abieti-Piceetalia* (Lakušić et al. 1979) Lakušić et Redžić 1988 (5)
- *Pino uncinatae-Piceetalia abietis* Julve 1993 (2b, 3b)

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PIC-01A *Piceion excelsae* Pawłowski et al. 1928

European boreo-montane spruce forests and subalpine open pine woods on nutrient-poor podzolic soils

- *Piceion abietis* Pawłowski et al. 1928 *nom. mut. propos.* (45)

pic05 The name in mutated form (*Piceion abietis*) has been used in phytosociological literature for a long time. The formal proposal to mutate the *Piceion excelsae* and replace it with the *Piceion abietis* was done by Chytrý (2013). (LM)

- *Cembrion* oder *Laricion* Rübel 1933 (orig.form) (2b)
- *Oxalidion acetosellae* Krajina 1933 (29b)
- *Oxalidion acetosellae* Krajina 1934 (phantom)
- *Vaccinio-Piceion excelsae* Br.-Bl. in Br.-Bl. et al. 1939 (syntax.syn.)
- *Piceion septentrionale* Tx. 1955 (2b)
- *Oxalido-Piceion excelsae* (Krajina 1933) Březina et Hadač in Hadač 1962 (syntax.syn.)
- *Vaccinio-Abietion albae* Oberd. 1962 (orig.form) (corresp.; as suballiance)
- *Piceion illyrico-moesiacum* P. Fukarek 1969 (2b)
- *Linnaeo-Piceion excelsae* (Br.-Bl. et Sissingh in Br.-Bl. et al. 1939) Oberd. 1979 (2b)
- *Linnaeo-Piceion abietis* (Br.-Bl. et Sissingh in Br.-Bl. et al. 1939) Rivas-Mart. in Rivas-Mart. et al. 2011 (31)
- *Pinion cembrae* Rivas-Mart. in Rivas-Mart. et al. 2011 (syntax.syn.)

pic06 The *Pinus cembra* open forests have been traditionally considered syntaxonomically as part of the *Piceion excelsae*. The altitudinal differentiation between the *Piceion excelsae* and *Pinion cembrae* (as suggested by Rivas-Martínez et al. 2011: 457) is unconvincing and lacks serious floristic grounds. (LM)

PIC-01B *Pinion peucis* Horvat 1950

Acidophilous Macedonian-pine forests in the montane to subalpine belts of the Southern Balkans

- *Pinion peucis* Lakušić 1972 (2b)

PIC-02 *Piceo obovatae-Pinetalia sibiricae* Ermakov 2013

Zonal mesophilous boreal coniferous forests on podzolic soils of easternmost European Russia, the Urals and Siberia

- *Carici macrourae-Abietetalia sibiricae* Lashchinskii et Korolyuk 2015 (2b, 5)

pic07 This order was invalidly published (Lashchinskii & Korolyuk 2015) because the indicated *typus* – the name *Carici macrourae-Abietion sibiricae* Lashchinskii et Korolyuk 2015 was invalid due to invalidity of the *Aegopodio podagrariae-Abietetum sibiricae* Lashchinskii et Korolyuk 2015 (the *typus* of *Carici macrourae-Abietion sibiricae*). One of the name-giving species (*Aegopodium podagraria*) of the association is not present in the indicated typus relevé as required by the ICPN art. 16. Syntaxonomically, the order was coined to include zonal dark-coniferous forests of the West Siberian southern taiga that have been earlier classified as the *Piceo obovatae-Pinetalia sibiricae* (Ermakov 2013). (WW, NE, LM)

PIC-02A *Aconito rubicundi-Abietion sibiricae* Anenkhonov et Chytrý 1998

Zonal mesophilous boreal coniferous forests with tall-herb undergrowth of easternmost European Russia, the Urals and Siberia

PIC-03 *Pinetalia sylvestris* Oberd. 1957

Holarctic boreo-temperate pine forests on nutrient-poor and hydromorphic soils

- *Betulo-Pinetalia sylvestris* Preising et Knapp 1942 (1)
- *Betulo-Pinetalia sylvestris* Preising 1944 (1)
- *Vaccinio-Pinetalia sylvestris* Scamoni et Passarge 1959 *nom. conserv. propos.* (52)

pic08 The formal conservation of this name has been proposed by Willner & Grabherr (2007: 236). (LM)

- *Cladonio-Vaccinietalia* Kielland-Lund 1967 (29b)
- *Dicrano-Pinetalia sylvestris* (Oberd. 1957) F.-K. Hartmann et G. Jahn 1967 (29b)
- *Pinetalia silvestris-peucis* Lakušić 1972 (2b)

PIC-03A *Dicrano-Pinion sylvestris* (Libbert 1933) W. Matuszkiewicz 1962 *nom. conserv. propos.*

European temperate and subboreal pine forests on nutrient-poor acidic sandy soils

pic09 The name '*Dicrano-Pinion* (Libbert 1933) W. Matuszkiewicz 1962' is widely used in the recent syntaxonomic literature in accordance with its type (e.g. Wallnöfer 1993; Pott 1995; Hommel et al. 1998; Schubert et al. 2001; Rennwald 2002). It should therefore be protected following the ICPN art. 52 against the older, yet rarely used and conceptually ambiguous name '*Pinion* (Libbert 1933) Oberd. 1957'. A formal proposal towards this end was made by Dengler et al. (2004) and Zelený in Chytrý (2013). (JD, LM)

- *Pinion medioeuropaeum* Libbert 1933 (34a)
- *Pinion* (Libbert 1933) Oberd. 1957 *nom. rejic. propos.*

pic10 The name *Pinion* (Libbert 1933) Oberd. 1957 (Oberdorfer 1957) should be rejected in order to preserve the widely used name *Dicrano-Pinion*. This name was lectotypified by the *Pinetum sylvestris neomarchicum* Libbert 1933 *nom. illeg.* by Berg in Dengler et al. (2004). (JD)

- *Pino-Quercion* Medwecka-Kornaś et al. in Szafer 1959 (syntax.syn.)
- *Deschampsio-Pinion sylvestris* Br.-Bl. 1961 (syntax.syn.)
- *Dicrano polyseti-Pinion sylvestris* (Libbert 1933) W. Matuszkiewicz 1962 (10c, 30)
- *Cetrario-Pinion hercynicae* Passarge 1968 (Regionalverband) (3d)
- *Cladonio-Pinion* Passarge 1968 (syntax.syn.)
- *Cladonio-Pinion sylvestris* Passarge 1968 (Regionalverband) (3d)

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- *Cladonio-Pinion* Passarge in Passarge et G. Hofmann 1968 (syntax.syn.)
- *Corynephoro-Pinion sylvestris* Passarge 1968 (syntax.syn.)
- *Corynephoro-Pinion sylvestris* Passarge in Passarge et G. Hofmann 1968 (31)
- *Eu-Cladonio-Pinion sylvestris* Passarge in Passarge et G. Hofmann 1968 (Regionalverband) (3d)
- *Pleurozio-Pinion sylvestris* Passarge 1968 (syntax.syn.)
- *Pleurozio-Pinion sylvestris* Passarge in Passarge et G. Hofmann 1968 (3d)
- *Pleurozio-Pinion* Passarge in Passarge et G. Hofmann 1968 (31)
- *Vaccinio-Pinion* (Libbert 1933) Passarge 1968 (29)
- *Vaccinio-Pinion hercynicae* Passarge 1969 (29)
- *Piceo-Pinion sylvestris* Lakušić 1982 (2b)

PIC-03B *Cladonio stellaris-Pinion sylvestris* Kielland-Lund ex Ermakov et Morozova 2011

Northern European and Western Siberian boreal oligotrophic pine forests

- *Cladonio stellaris-Pinion sylvestris* Kielland-Lund 1986 (2b)

PIC-04 *Vaccinio myrtilli-Betuletalia pubescentis* Mucina et Willner *ined.*

European boreo-subarctic and orotemperate birch woods and krummholz on nutrient-poor podzolic soils

pic11 The formal description of this unit will be presented elsewhere. (LM)

PIC-04A *Betulion carpatico-pubescentis* Rivas-Mart. et M. Costa in Rivas-Mart. et al. 2002

Orotemperate birch forests on podzolic soils in the montane and subalpine belts of the Alps and the Pyrenees

- *Betulion carpatico-pubescentis* Rivas-Mart. et al. 2001 (2b)

PIC-04B *Empetro hermaphroditi-Betulion pumilae* Mucina, Willner et Grabherr *ined.*

Boreal-subartic low birch woods and krummholz of Scandinavia and the Arctic Ocean islands

pic12 The formal description of this unit will be presented elsewhere. (LM)

- *Betulion tortuosae* Doing 1962 (2b)
- *Betulion tortuosae* Rivas-Mart. et al. 2002 (8)
- *Betulion tortuosae* Willner et Grabherr 2007 (2b)

PIC-05 *Ledo palustris-Laricetalia gmelinii* Ermakov in Ermakov et Alsynbayev 2004

Northeastern Eurasian taiga on long-frozen soils and permafrost

PIC-05A *Empetro-Piceion obovatae* Morozova et al. 2008

Northeastern European taiga on long-frozen soils and permafrost

PIC-06 *Athyrio filicis-feminae-Piceetalia* Hadač in Hadač et al. 1969

European boreo-montane spruce, fir and pine forests on nutrient-rich soils

- *Athyrio filicis-feminae-Piceetalia excelsae* Hadač 1962 (2b)
- *Calamagrostio-Abietetalia albae* P. Fukarek 1969 (3b)

PIC-06A *Chrysanthemo rotundifolii-Piceion* (Krajina 1933) Březina et Hadač in Hadač 1962

Mesic herb-rich spruce forests of the Central and Northern European mountains

- *Chrysanthemion rotundifolii* Krajina 1933 (29b)
- *Chrysanthemion rotundifolii* Krajina 1934 (phantom)
- *Athyrio alpestris-Piceion excelsae* Sýkora 1971 (syntax.syn.)

PIC-06B *Abieti-Piceion* (Br.-Bl. in Br.-Bl. et al. 1939) Soó 1964

Mesophilous fir forests on brown forest soils of the Central and southwestern European mountains

- *Abietion albae* Isser 1931
- *Abieti-Piceion* Br.-Bl. in Br.-Bl. et al. 1939 (corresp.; as suballiance)
- *Galio rotundifolii-Abietion albae* Oberd. 1957 (orig.form) (phantom)
- *Galio rotundifolii-Abietion albae* Oberd. 1962 (orig.form) (corresp.; as suballiance) (2b)
- *Galio rotundifolii-Abietion albae* Oberd. ex Rivas-Mart. 1964 (corresp.; as suballiance)
- *Abietion albae* Březina et Hadač in Hadač 1965 (31)
- *Abietion silicicolum* P. Fukarek 1969 (29, 34a)
- *Blechno-Abietion albae* P. Fukarek 1969
- *Piceo-Abietion* Ellenberg et Klötzli 1972 (phantom)
- *Piceo-Abietion* Ellenberg et Klötzli 1974 (3b)
- *Piceion abietis* Lakušić et al. 1979 (2b, 5)
- *Galio rotundifolii-Abietion albae* (Oberd. 1962) Rivas-Mart. 1987 (2b, 3f)

PIC-06C *Calamagrostio-Abietion* Horvat 1962 *nom. invers. propos.*

Mesic herb-rich fir forests on limestone and dolomite boulder screes in the montane and subalpine belts of the Western Balkans

pic13 The inversion of the name was proposed in Trinajstić (2008: 120) and Šilc & Čarni (2012: 160). This step was motivated by the fact that *Abies alba* is the dominating element of the uppermost tree layer. (LM)

- *Abieti-Calamagrostion* Horvat 1962 (orig.form)
- *Abieti-Calamagrostion* Horvat 1954 (2b)

PIC-06D *Seslerio caeruleae-Pinion uncinatae* Vigo 1974

Mesic herb-rich pine forests in the montane and subalpine belts of the Western Alps and the Pyrenees

- *Pinion uncinatae* Rivas-Mart. et M. Costa 1988 (syntax.syn.)
- *Pino uncinatae-Piceion abietis* Gillet in Julve 1993 (2b, 3b)

GROUP OF ORDERS OF THE OLIGOTROPHIC WOODED MIRES

PIC-07 *Vaccinio uliginosi-Pinetalia sylvestris* Passarge 1968

Eurasian open pine and spruce woods in oligotrophic mires

- *Vaccinietalia uliginosi* Lohmeyer et Tx. in Tx. 1955 (2b)

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- *Eriophoro-Piceetalia abietis* Passarge 1968 (Regionalordnung) (3d)
- *Eriophoro-Piceetalia abietis* Passarge in Passarge et G. Hofmann 1968 (phantom)
- *Eriophoro-Pinetalia* Passarge 1968 (syntax.syn.)
- *Eriophoro-Pinetalia sylvestris* Passarge 1968 (3d)
- *Eriophoro-Pinetalia* Passarge et G. Hofmann 1968 (31)
- *Uliginosi-Piceetalia abietis* Tx. ex Passarge 1968 (orig.form; Regionalordnung) (3d)
- *Vaccinio uliginosi-Piceetalia abietis* Passarge 1968 (phantom)
- *Vaccinio uliginosi-Piceetalia abietis* Passarge in Passarge et G. Hofmann 1968 (phantom)
- *Vaccinio uliginosi-Pinetalia sylvestris* Passarge et G. Hofmann 1968 (31)

PIC-07A *Vaccinio uliginosi-Pinion sylvestris* Passarge 1968

Eurasian open pine woods in oligotrophic mires

pic15 The formal proposition towards the name conservation (*Vaccinio uliginosi-Pinion sylvestris* Passarge et G. Hofmann 1968 *nom. conserv. propos.*) was published in Willner & Grabherr (2007: 237). (LM)

- *Oxycocco-Ledion palustris* Nordhagen 1936 (phantom)
- *Oxycocco-Ledion palustris* Nordhagen 1937 (2b)
- *Ledo-Pinion* Tx. 1955 *nom. invers. propos.* (*invers.superfl.*)

  pic16 Syntaxonomic position of the *Eriophoro vaginati-Pinion* and the *Vaccinio uliginosi-Pinion* requires further study due to complex small-scale mosaic patterns involving grass-dominated and dwarf-shrub dominated patches in the undergrowth of these wooded pine bogs, playing havoc in sampling and syntaxonomy. (LM)
- *Piceo-Pinion uncinatae* Tx. 1955 (2b)
- *Pino-Ledion palustris* Tx. 1955 (2b)
- *Eriophoro-Pinion sylvestris* Passarge 1968 (syntax.syn.)

  pic17 In case this name will be used to designate a valid syntaxonomic concept, the name inversion is warranted because the name-giving taxon *Pinus sylvestris* is found in the upper layer – the layer overtopping that of *Rhododendron tomentosum* (syn. *Ledum palustre*). (LM)
- *Eriophoro-Pinion sylvestris* Passarge in Passarge et G. Hofmann 1968 (31)
- *Vaccinio uliginosi-Pinion sylvestris* Passarge in Passarge et G. Hofmann 1968 (31)
- *Vaccinio uliginosi-Pinion sylvestris* Vorobiov et al. 1997 (31)

PIC-07B *Eriophoro-Piceion abietis* Passarge 1968

Eurasian spruce forests on oligotrophic mires

- *Eriophoro-Piceion abietis* Passarge in Passarge et G. Hofmann 1968 (31)
- *Pleurozio-Piceion abietis* Passarge 1968 (2b)
- *Uliginosi-Piceion abietis* Passarge 1968 (orig.form) (2b)

PIC-08 *Calamagrostio purpureae-Piceetalia obovatae* Lapshina 2010

Boreal spruce mires of Eastern Europe and Siberia

- *Calamagrostio canescentis-Piceetalia abietis* Solomeshch 1994 (1)

PIC-08A *Calamagrostio canescentis-Piceion abietis* Solomeshch in Willner et al. 2015

Boreal spruce mires of Eastern Europe and Siberia

- *Calamagrostio canescentis-Piceion abietis* Solomeshch in Solomeshch et Grigoriev 1992 (2b)

ASA *Asaro europaei-Abietetea sibiricae* Ermakov, Mucina et Zhitlukhina in Willner et al. 2016

Cool-temperate coniferous and mixed montane forests with nemoral and hemiboreal floristic elements of the Southern Urals and Southern Siberia

asa01 The *Abietetalia sibiricae* forms a zonal geographical margin of the *Carpino-Fagetea* in the Urals, at the eastern limit of its range and it represents a relict nemoral (subnemoral) vegetation type of Siberia. The floristic differences between this order and the *Carpino-Fagetea* are obvious and deserve to be recognized at the level of class (see Willner et al. 2016 for the formal description of the class). This vegetation occurs on moist nutrient-rich loamy soils in the foothills and low mountain ranges (300–800 m a.s.l.) of the Southern Urals and in isolated refugial areas of Southern Siberia, characterized by local ultra-humid low-continental climate. (NE)

- *Milio-Abietea* Zhitlukhina 1988 (1)

ASA-01 *Abietetalia sibiricae* (Ermakov in Ermakov et al. 2000) Ermakov 2006

Cool-temperate coniferous and mixed broad-leaved coniferous montane forests with nemoral and hemiboreal floristic elements of the Southern Urals and Southern Siberia

ASA-01A *Aconito septentrionalis-Piceion obovatae* Solomeshch, Grigoriev, Khaziakhmetov et Baisheva in Martynenko et al. 2008

Cool-temperate coniferous and mixed broad-leaved coniferous montane forests of the Southern Urals

- *Aconito septentrionalis-Piceion obovatae* Solomeshch et al. 1993 (1)

BRA *Brachypodio pinnati-Betuletea pendulae* Ermakov et al. 1991

Hemiboreal pine and birch-pine herb-rich open forests on fertile soils of the Southern Urals and Southern Siberia, and relict birch-poplar forests of Europe

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BRA-01 *Chamaecytiso ruthenici-Pinetalia sylvestris* Solomeshch et Ermakov in Ermakov et al. 2000

Hemiboreal pine and birch-pine herb-rich open forests on fertile soils of the Southern Urals and Southern Siberia

BRA-01A *Caragano fruticis-Pinion sylvestris* Solomeshch et al. 2002

Xeric pine-larch herb-rich open forests of the Southern Urals

BRA-01B *Veronico teucrii-Pinion sylvestris* Ermakov et Solomeshch in Ermakov et al. 2000

Birch-pine, pine and larch herb-rich open forests on dry soils of the Southern Urals

BRA-01C *Trollio europaei-Pinion sylvestris* Fedorov in Ermakov et al. 2000

Birch-pine herb-rich open forests on mesic soils of the Southern Urals

- *Trollio europaei-Pinion sylvestris* Fedorov 1991 (1)

BRA-02 *Fragario vescae-Populetalia tremulae* Willner et Mucina in Willner et al. 2016 *nom. inval.* (3b)

Relict extrazonal temperate deciduous birch-poplar woods on mineral soils of Europe

bra01 This (preliminary coined) order comprises natural pioneer and secondary birch-poplar woods on mineral soils in the temperate zone of Europe. The tree species composition resembles the forests that dominated Europe in the Early Holocene, i.e. before the *Carpino-Fagetea* species returned from their glacial refugia. See also Willner et al. (2016). (WW)

- *Betuletalia pendulae* Pop et Resmeriţă 1987 (2b)

BRA-02A *Fragario vescae-Populion tremulae* Willner et Mucina *ined.*

Relict extrazonal temperate deciduous birch-poplar woods on mineral soils of Europe

- *Betulion pendulae* Pop et Resmeriţă 1987 (5)

PYR *Pyrolo-Pinetea sylvestris* Korneck 1974

Euro-Siberian (sub)continental psammophilous (sub)thermophilous steppic pine forests

pyr01 Some authors (Oberdorfer et al. 1967; Passarge & Hofmann 1968; Korneck 1974; Oberdorfer in Oberdorfer 1992: 33–41) have classified some slightly basiphilous pine forests with continental drought-adapted species in Germany in the *Pyrolo-Pinetea* Korneck 1974 (syn. *Pulsatillo-Pinetea* Oberdorfer in Oberdorfer et al. 1967; *Festuco-Pinetea sylvestris* Passarge et G. Hofmann 1968). The concept of this class is based on the assumption that similar pine forests are widespread in the forest-steppe zone of the Eastern Europe and Western Siberia. Ermakov (1999, 2003) classified dry pine forests on sandy soils in the forest-steppe zone of southwestern Siberia into the *Pyrolo-Pinetea*. Studies of German and Polish basiphilous dry pine forests (W. Matuszkiewicz 1962; Heinken & Zippel 1999; J.M. Matuszkiewicz 2001; Heinken 2008), consider analogous vegetation types only at the association level and classify them within the *Dicrano-Pinion*. As there is no comprehensive comparative study of the East European dry pine forests, I support the compromise solution proposed by Berg (in Berg et al. 2004: 459–468), assigning the basiphilous dry pine forests of Central Europe to the *Festuco-Pinion sylvestris* (the *Vaccinio-Piceetea*). (MC) Russian and Ukrainian authors (Ermakov et al. 2000; Solomakha 2008; both using the name '*Pulsatillo-Pinetea*') prefer to retain this syntaxonomic concept at the class level. (LM, NE) Oberdorfer et al. (1967: 51–51) introduced a suggestion by D. Korneck combining the *Pulsatillo-Pinetea* (described, albeit invalidly, in the same paper) and the *Erico-Pinetea* to form a new class – the *Pyrolo-Pinetea*. The latter class has been described validly later (Korneck 1974: 168) with reference to the original suggestion, but the protologue of the *Pyrolo-Pinetea* does not anymore suggest the option of also including the *Erico-Pinetea*. (LM)

- *Pyrolo-Pinetea sylvestris* Oberd. in T. Müller 1966 (2b)
- *Pulsatillo-Pinetea sylvestris* Oberd. in Oberd. et al. 1967 (2b)
- *Pyrolo-Pinetea sylvestris* Korneck in Oberd. et al. 1967 (2b)
- *Festuco-Pinetea sylvestris* Passarge 1968 (Regionalklasse) (3d)
- *Festuco-Pinetea sylvestris* Passarge et G. Hofmann 1968 (Regionalklasse) (3d)

PYR-01 *Astragalo monspessulani-Pinetalia sylvestris* Oberd. in Theurillat et al. 1995

Thermophilous steppic pine forests in deep valleys of the Central and Western Alps

pyr02 Bardat et al. (2004) suggested incorporating this order into the *Erico-Pinetea* – a view we do not support due to very different ecology and species composition of the understorey as well as contrasting evolutionary community assembly of the *Erico-Pinetea* and *Pyrolo-Pinetea*. (LM)

- *Astragalo-Pinetalia sylvestris* Oberd. et T. Müller 1983 (2b, 8)
- *Ononido-Pinetalia sylvestris* Gentile 1984 (2b, 8)
- *Astragalo-Pinetalia sylvestris* Oberd. 1992 (2b)

PYR-01A *Ononido rotundifoliae-Pinion sylvestris* Br.-Bl. 1950

Thermophilous steppic pine forests in deep valleys of the Central and Western Alps

PYR-02 *Festuco-Pinetalia sylvestris* Passarge 1968

Subcontinental north-temperate and subboreal psammophilous pine forests in the lowlands of Central and Northern Europe

- *Pyrolo-Pinetalia* T. Müller 1966 (2b, 8)
- *Pulsatillo-Pinetalia* Oberd. in T. Müller 1966 (2b, 8)
- *Pulsatillo-Pinetalia* Oberd. in Oberd. et al. 1967 (2b)

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- *Festuco-Pinetalia sylvestris* Passarge in Passarge et G. Hofmann 1968 (31)
- *Pulsatillo-Pinetalia* Oberd. ex Korneck 1974 (2b)
- *Stipo-Pinetalia* Passarge 1978 (2b)
- *Pulsatillo-Pinetalia sylvestris* Oberd. 1992 (2b)

PYR-02A *Festuco-Pinion sylvestris* Passarge 1968

Subcontinental north-temperate and subboreal psammophilous pine forests in the lowlands of Central and Northern Europe

- *Chamaecytiso ruthenici-Pinion* Krausch 1962 *nom. mut. propos.* (3b, *mut.superfl.*)
- *Cytiso ratisbonensis-Pinion sylvestris* Krausch 1962 (3b)
- *Festuco-Pinion sylvestris* Passarge in Passarge et G. Hofmann 1968 (31)
- *Stipo-Pinion sylvestris* Passarge 1968 (Regionalordnung) (3d)
- *Stipo-Pinion sylvestris* Passarge in Passarge et G. Hofmann 1968 (Regionalordnung) (3d)
- *Festuco vaginatae-Pinion sylvestris* Soó 1971
- *Cytiso ruthenici-Pinion sylvestris* Krausch 1962 *corr.* Oberd. 1983 (3b, *mut.superfl.*)
- *Festuco ovinae-Pinion sylvestris* Vorobiov et al. 1997

PYR-03 *Koelerio glaucae-Pinetalia sylvestris* Ermakov 1999

Continental xeric psammophilous pine forests in the forest-steppe and steppe zones of Eastern Europe

PYR-03A *Koelerio glaucae-Pinion sylvestris* Ermakov 1999

Continental xeric psammophilous pine forests in the forest-steppe and steppe zones of Eastern Europe

VEGETATION OF THE NEMORAL FOREST ZONE

ZONAL TEMPERATE BROAD-LEAVED FORESTS

FAG *Carpino-Fagetea sylvaticae* Jakucs ex Passarge 1968

Mesic deciduous and mixed forests of temperate Europe, Anatolia, the Caucasus and Southern Siberia

fag01 Several authors have argued that the name *Querco-Fagetea* cannot be maintained when the *Quercetea pubescentis* is accepted as a separate class. A new analysis of the complex nomenclature surrounding this name supports this view (see Willner et al. 2015). (WW)

- *Querco-Fagetea sylvaticae* Br.-Bl. et Vlieger in Vlieger 1937 (35)
- *Carpino-Fagetea sylvaticae* Jakucs 1960 (2b, 3b)
- *Carpino-Fagetea sylvaticae* Jakucs 1967 (2b, 3b)

fag02 See Willner et al. (2015) for detailed considerations on the validity of this name. (WW)

- *Carpino-Fagetea sylvaticae* Jakucs ex P. Fukarek 1968 (31)
- *Carpino-Fagetea sylvaticae* Passarge et G. Hofmann 1968 (31)
- *Geranio-Fraxinetea excelsioris* Passarge 1968 (syntax.syn.)
- *Geranio-Fraxinetea excelsioris* Passarge 1968 (Regionalklasse) (3d)
- *Geranio-Fraxinetea excelsioris* Passarge et G. Hofmann 1968 (31)
- *Carpino-Fagetea orientalis* Passarge 1973 (syntax.syn.)
- *Fagetea hyrcanica* Zohary 1973 (2b)
- *Querco-Fagetea orientalis* Zohary 1973 (2b)
- *Fraxino-Fagetea sylvaticae* Moor 1976 (29c)
- *Tilietea platyphylli* Moor 1977 (syntax.syn.)
- *Fagetea* Lakušić et al. 1979 (2b, 3g)

FAG-01 *Luzulo-Fagetalia sylvaticae* Scamoni et Passarge 1959

Acidophilous beech and mixed fir-beech forests on nutrient-poor soils in the nemoral zone of temperate Europe and as relicts at high altitudes of Corsica

fag03 The classification of the *Luzulo-Fagetalia* and the *Luzulo-Fagion* is highly controversial. Some authors classify these syntaxa in the *Quercetea robori-petraeae* (e.g. Theurillat et al. 1995). However, the montane acidophilous beech forests of Central and Southern Europe are floristically closely connected with those of base-rich substrates (e.g. Bergmeier & Dimopoulos 2001; Willner 2002; Tzonev et al. 2006). (EB, MC, RDP, WW) LM and JPT prefer classifying the *Luzulo-Fagetalia* within the *Quercetea robori-petraeae.*

- *Myrtillo-Fagetalia sylvaticae* G. Hofmann et Passarge ex G. Hofmann 1965 (orig.form) (syntax.syn.)
- *Dicrano-Fagetalia sylvaticae* Passarge 1968 (Regionalordnung) (3d)
- *Dicrano-Fagetalia sylvaticae* Passarge in Passarge et G. Hofmann 1968 (Regionalordnung) (3d)
- *Eu-Luzulo-Fagetalia sylvaticae* Passarge 1968 (Regionalordnung) (3d)
- *Eu-Luzulo-Fagetalia sylvaticae* Passarge in Passarge et G. Hofmann 1968 (Regionalordnung) (3d)
- *Luzulo-Fagetalia sylvaticae* P. Fukarek 1969 (2b)

FAG-01A *Luzulo-Fagion sylvaticae* Lohmeyer et Tx. in Tx. 1954

Acidophilous beech and mixed fir-beech forests of Central Europe

- *Deschampsio-Fagion sylvaticae* Soó 1962 (3b)
- *Myrtillo-Fagion sylvaticae* G. Hofmann et Passarge in Scamoni 1963 (orig.form) (3b)
- *Deschampsio-Fagion sylvaticae* Soó 1964 (3b)
- *Luzulo pilosae-Fagion* Passarge 1965 (phantom?)
- *Myrtillo-Fagion sylvaticae* G. Hofmann et Passarge ex G. Hofmann 1965 (orig.form) (syntax.syn.)
- *Dicrano-Fagion sylvaticae* Passarge 1968 (syntax.syn.)
- *Dicrano-Fagion sylvaticae* Passarge et G. Hofmann 1968 (31)

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- *Eu-Luzulo-Fagion sylvaticae* Passarge 1968 (Regionalverband) (3d)
- *Eu-Luzulo-Fagion sylvaticae* Passarge in Passarge et G. Hofmann 1968 (orig.form; Regionalverband) (3d)
- *Eu-Myrtillo-Fagion sylvaticae* Passarge 1968 (orig.form; Regionalverband) (3d)
- *Eu-Myrtillo-Fagion sylvaticae* Passarge in Passarge et G. Hofmann 1968 (orig.form; Regionalverband) (3d)
- *Maianthemo-Fagion sylvaticae* Passarge 1968 (Regionalverband) (3d)
- *Maianthemo-Fagion sylvaticae* Passarge in Passarge et G. Hofmann 1968 (Regionalverband) (3d)
- *Melampyro-Fagion sylvaticae* Passarge 1968 (Regionalverband) (3d)
- *Melampyro-Fagion sylvaticae* Passarge in Passarge et G. Hofmann 1968 (Regionalverband) (3d)
- *Molinio-Fagion sylvaticae* Passarge 1968 (syntax.syn.)
- *Molinio-Fagion sylvaticae* Passarge et G. Hofmann 1968 (31)
- *Polygonato verticillati-Fagion sylvaticae* Passarge 1968 (Regionalverband) (3d)
- *Fagion moesiacum* P. Fukarek 1969 (2b)
- *Deschampsio-Fagion sylvaticae* Soó 1971 (syntax.syn.)

FAG-01B *Ilici-Fagion sylvaticae* Br.-Bl. 1967

Acidophilous beech forests of the atlantic regions of southwestern Europe

FAG-01C *Galio rotundifolii-Fagion* Gamisans 1975

Relict acidophilous beech forests on nutrient-poor soils of Corsica

- *Fago-Pinion corsianae* Br.-Bl. 1955 (2b)
- *Galio rotundifolii-Fagion* Gamisans 1977 (31)

FAG-02 *Fagetalia sylvaticae* Pawłowski 1928

Basiphilous beech and mixed fir-beech forests in the nemoral zone and in the montane belt of the submediterranean regions of temperate Europe

fag04 The further subdivision of this order reflects the biogeographic differentiation and post-glacial history of European beech forests. However, the extensive splitting as proposed by some authors (e.g. Dierschke & Bohn 2004) is not supported by floristic evidence (see also the Remark for the *Fagion sylvaticae*). For the complex nomenclature of the name *Fagetalia sylvaticae* see Willner et al. (2015). (WW)

- *Querco-Fagetalia sylvaticae* Vanden Berghen 1957 (syntax.syn.)
- *Carpino-Fagetalia sylvaticae* Scamoni et Passarge 1959 (syntax.syn.)
- *Fraxinetalia* Scamoni et Passarge 1959 (syntax.syn.)

fag05 This order was typified using the *Acero-Ulmion* Scamoni et Passarge 1959 by Clausnitzer & Spangenberg in Dengler et al. (2004: 381) that is considered a synonym of the *Fagion sylvaticae* Luquet 1926. (WW)

- *Aegopodio-Fagetalia sylvaticae* Passarge 1968 (29c)
- *Aegopodio-Fagetalia sylvaticae* Passarge et G. Hofmann 1968 (31)
- *Asperulo-Fagetalia sylvaticae* Passarge 1968 (Regionalordnung) (3d)
- *Asperulo-Fagetalia sylvaticae* Passarge in Passarge et G. Hofmann 1968 (Regionalordnung) (3d)
- *Mercuriali-Fagetalia sylvaticae* Passarge 1968 (Regionalordnung) (3d)
- *Mercuriali-Fagetalia sylvaticae* Passarge in Passarge et G. Hofmann 1968 (Regionalordnung) (3d)
- *Dentario-Fagetalia sylvaticae* P. Fukarek 1969 (syntax.syn.)
- *Aremonio-Fagetalia sylvaticae* Gentile 1970 (3b)
- *Aremonio-Fagetalia sylvaticae* Gentile ex Feoli et Lagonegro 1982 (5)
- *Abieti albae-Fagetalia sylvaticae* Gillet 1986 (1)

FAG-02A *Aremonio-Fagion* (Horvat 1950) Borhidi in Török et al. 1989

Refugial basiphilous beech and mixed fir-beech forests of the northwestern Balkans and the Eastern Alps

fag06 This alliance represents the main refugium area of European beech forests located in the northwest of the Balkan Peninsula (Magri et al. 2006; Willner et al. 2009). It includes two suballiances – the *Ostryo-Fagenion* (thermophilous beech forests) and the *Lonicero alpigenae-Fagenion* (montane beech and beech-fir forests; incl. *Lamio orvalae-Fagenion*) according to Willner (2002). (WW)

- *Fagion illyricum* Horvat 1938 (3b, 3c)
- *Fagion illyricum* Horvat 1950 (34a)
- *Fagion austroalpinum* P. Fukarek 1979 (2b)
- *Lonicero alpigenae-Fagion* Dierschke 1998 (syntax.syn.)

FAG-02B *Fagion sylvaticae* Luquet 1926

Partly refugial post-glacial basiphilous beech and mixed fir-beech forests of the temperate Europe

fag07 This alliance includes all basiphilous beech forests lacking numerous diagnostic species of the *Aremonio-Fagion* and of the *Geranio-Fagion* found in the two main refugial areas of European beech forests – the Balkans and the Apennines, respectively. The various alliances proposed for other putative refugia (e.g. the *Scillo-Fagion* for the Pyrenees, the *Symphyto-Fagion* for the Carpathians) have only weak floristic support. Instead, several geographically defined suballiances of the thermophilous and mesic beech forests could be distinguished within the *Fagion sylvaticae*. (WW) LM disagrees and suggests recognizing the *Scillo-Fagion* and the *Symphyto-Fagion* as alliances in their own right.

- *Fagion sylvaticae* Pawłowski 1928 (31)
- *Fagion septentrionale* Tx. 1931 (34a)
- *Eufagion* Tx. et Diemont 1936 (34b)
- *Eu-Fagion* Klika in Klika et Novák 1941 (34b)
- *Asperulo-Fagion* Knapp 1942 (1)
- *Asperulo-Fagion* Tx. 1955 (2b)

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fag08 Willner (2002: 371) considers this name as validly published. (WW)
- *Cephalanthero-Fagion* Tx. 1955 (2b)
- *Cephalanthero-Fagion* Tx. ex Vanden Berghen 1957 (syntax.syn.)
- *Asperulo-Fagion* Knapp ex Tx. et Oberd. 1958 (syntax.syn.)
- *Aceri-Ulmion* Scamoni et Passarge 1959 (syntax.syn.)

fag09 Spangenberg in Dengler et al. (2004: 381) typified this alliance using the *Fraxino-Fagetum* Scamoni 1956 as the *typus*. (WW)
- *Fagion dacicum* Soó 1960 (34a)
- *Fagion medio-europaeum* Soó 1962 (34a)
- *Fraxino excelsioris-Fagion sylvaticae* Hofmann et Passarge in Scamoni 1963 (3b)
- *Scillo-Fagion* Oberd. ex Soó 1964 (syntax.syn.)
- *Scillo-Fagion* Br.-Bl. 1967 (31)
- *Antherico-Fagion sylvaticae* Passarge 1968 (3b)
- *Dentario-Fagion sylvaticae* Passarge 1968 (Regionalverband) (3d)
- *Eu-Asperulo-Fagion sylvaticae* Passarge 1968 (Regionalverband) (3d)
- *Eu-Fraxino-Fagion sylvaticae* Passarge 1968 (Regionalverband) (3d)
- *Eu-Mercuriali-Fagion sylvaticae* Passarge 1968 (Regionalverband) (3d)
- *Eu-Mercuriali-Fagion sylvaticae* Passarge in Passarge et G. Hofmann 1968 (Regionalverband) (3d)
- *Impatienti-Fagion sylvaticae* Passarge 1968 (Regionalverband) (3d)
- *Mercuriali-Fagion sylvaticae* G. Hofmann in Passarge 1968 (syntax.syn.)
- *Mercuriali-Fagion sylvaticae* G. Hofmann in Passarge et G. Hofmann 1968 (31)
- *Petasito-Fagion sylvaticae* Passarge 1968 (Regionalverband) (3d)
- *Rumici arifolii-Fagion sylvaticae* Passarge 1968 (Regionalverband) (3d)
- *Seslerio-Fagion sylvaticae* Passarge 1968 (Regionalverband) (3d)
- *Sorbo-Fagion sylvaticae* Passarge 1968 (syntax.syn.)
- *Sorbo-Fagion sylvaticae* Passarge in G. Hofmann in Passarge 1968 (31)
- *Sorbo torminalis-Fagion sylvaticae* Passarge 1968 (Regionalverband) (3d)
- *Sorbo torminalis-Fagion* Passarge in Passarge et G. Hofmann 1968 (Regionalverband) (3d)
- *Fagion moesiacae* Blečić et Lakušić 1970 (syntax.syn.)
- *Fagion moesiacae* Dafis 1973 (2b)
- *Abieti-Fagion* Ellenberg et Klötzli 1974 (3b)
- *Fagion moesiacum* Horvat et al. 1974 (34a)
- *Buxo-Fago-Abietion* Barbero et Quézel 1975 (34c)
- *Geranio nodosi-Fagion* Gentile 1975 (3b)
- *Abieti-Fagion* Moor 1976 (2b)
- *Aceri-Fagion* (Oberd. 1957) Moor 1976 (syntax.syn.)
- *Fagion moesiacae subalpinum* B. Jovanović 1976 (31, 34a)
- *Fagion circumpannonicum* P. Fukarek 1977 (2b)
- *Geranio nodosi-Fagion* Gentile ex Feoli et Lagonegro 1982 (syntax.syn.)
- *Symphyto cordati-Fagion* (Vida 1963) Täuber 1982 (syntax.syn.)
- *Fagion moesiacae* Török et al. 1989 (31)
- *Acerion pseudoplatani* (Oberd. 1957) Rameau in Rameau et al. 1993 (phantom)
- *Cephalanthero rubrae-Fagion sylvaticae* (Tx. in Tx. et Oberd. 1958) Rameau 1996 (1)
- *Endymio non-scripti-Fagion* Dierschke (1989) 1998 (syntax.syn.)
- *Acerion pseudoplatani* (Oberd. 1957) Rameau in Bensettiti et al. 2001 (2b)
- *Cephalanthero rubrae-Fagion sylvaticae* (Tx. in Tx. et Oberd. 1958) Boullet et Rameau in Bensettiti et al. 2001 (2b)
- *Cephalanthero-Fagion sylvaticae* (Tx. in Tx. et Oberd. 1958) Rameau in Royer et al. 2006 (31)
- *Doronico columnae-Fagion moesiacae* (Dzwonko et al. 1999) Dierschke in Dierschke et Bohn 2004 (syntax.syn.)
- *Seslerio autumnalis-Fagion moesiacae* (Blečić et Lakušić 1970) Redžić et Barudanović 2010 (29c)
- *Carpino betuli-Fagion sylvaticae* Bœuf, Renaux et Royer in Bœuf 2011 (syntax.syn.)

FAG-02C *Geranio striati-Fagion* Gentile 1970

Refugial basiphilous beech and mixed fir-beech forests of Southern Italy and the southwestern Balkans

fag10 This alliance represents the main refugium area of the European beech forests located in Southern Italy as well as the putative refugia in Northern Hellas (Magri et al. 2006; Willner et al. 2009). (WW)
- *Fagion mediterraneo-montanum* Br.-Bl. et A. Hofmann in A. Hofmann 1960 (2b)
- *Fagion austro-italicum* Soó 1964 (3b)
- *Fagion hellenicum* Quézel 1967 (34a)
- *Fagion meridionale* Quézel 1967 (34a)
- *Geranio versicoloris-Fagion* Gentile 1970 *nom. mut. propos.* (45)

fag11 A formal proposal to introduce this *nomen mutatum* was published by Di Pietro et al. (2004: 32). (LM)
- *Fagion hellenicum* Horvat et al. 1974 (2b)
- *Aquifolio-Fagion* Corbetta et Ubaldi in Ubaldi et al. 1986 (orig.form) (5)
- *Campanulo trichocalycinae-Fagion* Corbetta et Ubaldi in Ubaldi et al. 1986 (5)
- *Campanulo trichocalycinae-Fagion* Corbetta et Ubaldi in Ubaldi et al. 1990 (5)
- *Doronico orientalis-Fagion sylvaticae* Ubaldi et al. 1990 (5)

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- *Doronico orientalis-Fagion sylvaticae* Ubaldi et al. ex Ubaldi 1995 (syntax.syn.)
- *Doronico orientalis-Fagion moesiacae* (Raus 1980) Dierschke 1998 (2b)
- *Campanulo trichocalycinae-Fagion* Ubaldi ex S. Brullo et al. 2001 (29c)
- *Doronico orientalis-Fagion moesiacae* (Raus ex Bergmeier 1990) Dierschke in Dierschke et Bohn 2004 (syntax.syn.)

FAG-03 *Carpinetalia betuli* P. Fukarek 1968

Oak-hornbeam and mesic oak forests on deep nutrient-rich soils of the temperate Europe

fag12 Bardat et al. (2004) used the rank of suborder (the *Carpino betuli-Fagenalia sylvaticae*; *typus: Carpinion betuli;* valid name: *Carpino betuli-Fagenalia sylvaticae* Rameau in Royer et al. 2006) for this syntaxonomic concept. (JPT)

- *Bromo-Carpinetalia betuli* Passarge 1968 (Regionalordnung) (3d)
- *Bromo-Carpinetalia betuli* Passarge in Passarge et G. Hofmann 1968 (Regionalordnung) (3d)
- *Dactylido-Carpinetalia betuli* Passarge 1968 (Regionalordnung) (3d)
- *Dactylido-Carpinetalia betuli* Passarge in Passarge et G. Hofmann 1968 (Regionalordnung) (3d)
- *Polytricho-Carpinetalia betuli* Passarge 1968 (Regionalordnung) (3d)
- *Polytricho-Carpinetalia betuli* Passarge in Passarge et G. Hofmann 1968 (Regionalordnung) (3d)
- *Querco-Carpinetalia betuli* P. Fukarek 1969 (29a)
- *Querco petraeae-Carpinetalia betuli* Moor 1976 (29c)
- *Tilio-Carpinetalia betuli* Celiński in Moor 1978 (3b)
- *Quercetalia petraeae* Lakušić et al. 1979 (2b, 5)
- *Quercetalia petraeae* Korzhenevskii 1982 (2b)
- *Pruno avium-Carpinetalia betuli* Gillet 1986 (1)
- *Lathyro-Carpinetalia betuli* Täuber 1987

CENTRAL EUROPEAN ALLIANCE

FAG-03A *Carpinion betuli* Issler 1931

Oak-hornbeam forests on deep nutrient-rich soils of the cool-temperate Europe and the British Isles

- *Carpinion-(Fagion)* Mayer 1937 (orig.form)
- *Alno-Carpinion* Tx. et Diemont 1936 (3b)
- *Alno-Fraxinion* Meijer Drees 1936 (29c)
- *Fraxino-Carpinion* Tx. et Diemont 1936 (3b)
- *Fraxino-Carpinion* Tx. 1937 (syntax.syn.)
- *Carpinion betuli* Oberd. 1953 (31)
- *Eu-Carpinion* Scamoni et Passarge 1959 (34b)
- *Bromo-Carpinion betuli* Passarge 1968 (2b)
- *Bromo-Carpinion betuli* Passarge et G. Hofmann 1968 (syntax.syn.)
- *Dactylido-Carpinion betuli* Passarge 1968 (syntax.syn.)
- *Dactylido-Carpinion betuli* Passarge et G. Hofmann 1968 (31)
- *Melampyro-Carpinion betuli* Passarge 1968 (syntax.syn.)
- *Melampyro-Carpinion betuli* Passarge et G. Hofmann 1968 (31)
- *Polytricho-Carpinion betuli* Passarge 1968 (syntax.syn.)
- *Polytricho-Carpinion betuli* Passarge et G. Hofmann 1968 (31)
- *Stellario-Carpinion betuli* Passarge 1968 (syntax.syn.)
- *Stellario-Carpinion betuli* Passarge et G. Hofmann 1968 (31)
- *Stachyo-Carpinion betuli* Passarge 1968 (syntax.syn.)
- *Stachyo-Carpinion betuli* Passarge et G. Hofmann 1968 (31)
- *Lathyro hallersteinii-Carpinion* Boşcaiu 1974
- *Pulmonario-Carpinion* (Oberd. 1957) Kissling 1983 (syntax.syn.)
- *Galio-Carpinion* (Oberd. 1957) Kissling 1983 (syntax.syn.)
- *Tilio cordatae-Carpinion* (Oberd. 1957) Kissling 1983 (syntax.syn.)
- *Aceri campestris-Carpinion betuli* Gillet 1986 (1)
- *Lonicero periclymeni-Carpinion* (S. Müller 1978) Julve 1988
- *Mercuriali-Carpinion* S. Müller ex Julve 1988
- *Aceri campestris-Carpinion betuli* Gillet ex Julve 1993 (2b)
- *Querco-Fagion* Rameau 1996 (2b)

SUBMEDITERRANEAN GROUP OF ALLIANCES

FAG-03B *Pulmonario longifoliae-Quercion roboris* Rivas-Mart. et Izco in Rivas-Mart. et al. 2002

Oak forests on deep base-rich gleyic soils of the atlantic regions of Western Europe

- *Polysticho setiferi-Quercion roboris* Géhu 2007 (syntax.syn.)

FAG-03C *Erythronio-Carpinion* (Horvat 1958) Marinček in Wallnöfer et al. 1993

Oak-hornbeam forests on deep nutrient-rich soils of the Balkans and Northern Italy

- *Carpinion illyrico-moesiacum* Horvat 1958 (phantom)
- *Carpinion illyrico-podolicum* Horvat 1958 (34a)
- *Carpinion illyricum* Horvat 1958 (phantom)
- *Carpinion illyricum* Horvat 1963 (34a)
- *Quercion petraeae* Lakušić et al. 1979 (2b, 5)

FAG-03D *Castaneo sativae-Carpinion orientalis* Quézel, Barbero et Akman ex Quézel et al. 1993

Thermophilous hornbeam forests on deep nutrient-rich soils of southeastern Balkans

- *Castaneo-Carpinion* Quézel, Barbero et Akman 1980 (5)
- *Castaneo sativae-Carpinion orientalis* Barbero et Akman ex Quézel et al. 1992 (phantom)

FAG-03E *Paeonio dauricae-Quercion petraeae* Didukh 1996

Mesic deciduous oak forests on deep nutrient-rich soils of Crimea

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- *Corno-Quercion petraeae* Korzhenevskii 1982 (2b, 5)
- *Lathyro laxiflorae-Quercion petraeae* Didukh 1996 (syntax.syn.)

SUB-CONTINENTAL GROUP OF ALLIANCES

FAG-03F *Querco roboris-Tilion cordatae* Solomeshch et Laiviņš ex Bulokhov et Solomeshch in Bulokhov et Semenishchenkov 2015

Subboreal broad-leaved and mixed forests on deep nutrient-rich soils of northwestern Russia and the Baltic countries

fag13 This continental zonal vegetation type replaces the *Carpinion betuli* in Eastern Europe. (DI) Some authors (e.g. Onyshchenko 2010) place this alliance within the *Fagetalia sylvaticae*. (LM) The '*Tilio-Acerion*' *sensu* Dierßen & Dierßen (1996) probably also belongs to this alliance. (WW)

- *Querco roboris-Tilion cordatae* Solomeshch et Laiviņš 1993 (2b)
- *Querco roboris-Tilion cordatae* Solomeshch et Laiviņš ex Bulokhov et Solomeshch 2003 (5)

FAG-03G *Scillo sibericae-Quercion roboris* Onyshchenko 2009

Mesic deciduous mixed forests on deep nutrient-rich soils in the eastern forest-steppe zone and as extrazonal in the steppe zone of Ukraine and Russia

- *Aceri campestris-Quercion roboris* Bulokhov et Solomeshch 2003 (5)
- *Aceri campestris-Quercion roboris* Bulokhov et Solomeshch in Bulokhov et Semenishchenkov 2015 (syntax.syn.)

FAG-03H *Aconito lycoctoni-Tilion cordatae* Solomeshch et Grigoriev in Willner et al. 2016

Subthermophilous broad-leaved forests on deep nutrient-rich soils of the Southern Urals

- *Aconito septentrionalis-Tilion cordatae* Solomeshch et al. 1993 (1)

FAG-04 *Lathyro-Carpinetalia caucasicae* Passarge 1981

Euxino-Hyrcanian xero-mesic oak-hornbeam forests on calcareous soils

FAG-04A *Crataego-Carpinion caucasicae* Passarge 1981

Caucasian xero-mesic oak-hornbeam forest on brown forest soils over limestone in the lower montane belt

- *Carpino betuli–Quercion petraeae* Grebenshchikov et al. 1990 (syntax.syn.)

FAG-04B *Astrantio–Carpinion caucasicae* Passarge 1981

Caucasian xero-mesic oak-hornbeam forests on shallow calcareous soils on steep slopes in the upper montane belt

FAG-05 *Aceretalia pseudoplatani* Moor 1976 *nom. conserv. propos.*

Scree and ravine maple-lime forests of the nemoral zone of the temperate Europe

fag14 The formal proposal for the conservation of this name was published in Willner (2015). (LM)

- *Aceri-Fraxinetalia excelsae* Passarge 1968 (Regionalordnung) (3d)
- *Aceri-Fraxinetalia excelsae* Passarge in Passarge et G. Hofmann 1968 (Regionalordnung) (3d)
- *Tilietalia* Moor 1973 (syntax.syn.)
- *Tilio-Aceretalia* Clot 1989 (5)

COOL TEMPERATE GROUP OF ALLIANCES

FAG-05A *Tilio-Acerion* Klika 1955

Sycamore maple forests in the montane belt and cool ravines of the Central European mountain ranges

fag15 The concept of the *Tilio-Acerion* presented here is much narrower than in most previous studies. Therefore, it might be advisable to reject the name *Tilio-Acerion* and to conserve the name *Lunario-Acerion* Moor 1973 for the cool temperate maple forests. Yet we refrain from putting forward a formal proposal to this effect at this stage since the delimitation of the alliances within the *Aceretalia pseudoplatani* needs further study. (WW, JPT) LM and MC do not support this suggestion since the use of the name *Tilio-Acerion* did not show serious signs of misinterpretation in the past.

- *Adenostylo-Acerion pseudoplatani* Passarge 1968 (Regionalverband) (3d)
- *Adoxo-Acerion pseudoplatani* Passarge 1968 (Regionalverband) (3d)
- *Adoxo-Acerion pseudoplatani* Passarge in Passarge et G. Hofmann 1968 (Regionalverband) (3d)
- *Carpino-Ulmion scabrae* Passarge 1968 (Regionalverband) (3d)
- *Dentario-Acerion pseudoplatani* Passarge 1968 (Regionalverband) (3d)
- *Dentario-Acerion pseudoplatani* Passarge in Passarge et G. Hofmann 1968 (Regionalverband) (3d)
- *Stachyo-Acerion pseudoplatani* Passarge 1968 (syntax.syn.)
- *Stachyo-Acerion pseudoplatani* Passarge et G. Hofmann 1968 (31)
- *Lunario-Acerion pseudoplatani* Moor 1973 (syntax.syn.)
- *Tilio-Acerion* Ellenberg et Klötzli 1974 (3b)

FAG-05B *Melico-Tilion platyphylli* Passarge et G. Hofmann 1968

Thermophilous lime forests on scree slopes at low altitudes of the southern regions of Central Europe

- *Tilion* Doing Kraft 1955 (2b)
- *Melico-Tilion platyphylli* Passarge 1968 (2b)
- *Tilion* Moor 1973 (29c)
- *Sorbo-Fraxinion* Béguin et Theurillat 1981 (3g)
- *Sorbo ariae-Fraxinion excelsioris* Béguin et Theurillat 1984 (syntax.syn.)
- *Asperulo taurinae-Tilion cordatae* Ubaldi 2003 (syntax.syn.)
- *Phaegopterido-Fraxinion excelsioris* Ubaldi 2003 (syntax.syn.)

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FAG-05C *Dryopterido affinis-Fraxinion excelsioris* Vanden Berghen ex Bœuf et al. in Bœuf 2011

Atlantic ash-maple scree forests of Western Europe

fag16 This unit was described in Vanden Berghen (1969), under the '*Fraxino-Carpinion*, sous-alliance à *Hypericum androsaemum*' (ICPN art. 3e). Rivas-Martínez et al. (2002a) included the Atlantic ash-maple forests in the *Pulmonario longifoliae-Quercion roboris*. (WW)

- *Polysticho-Corylion* Vanden Berghen ex Géhu et Géhu-Franck 1988 (29b)
- *Polysticho-Fraxinion* Rameau 1996 (1)
- *Polysticho setiferi-Fraxinion excelsioris* Rameau ex Royer et al. 2006 (2b)
- *Polysticho setiferi-Fraxinion excelsioris* Géhu 2007 (8)

fag17 This name is considered as invalid because the author indicated only 'key species' and not the character and/or differential species as required by the ICPN art. 8. (WW)

SUBMEDITERRANEAN GROUP OF ALLIANCES

FAG-05D *Fraxino excelsioris-Acerion pseudoplatani* P. Fukarek 1969

Submediterranean mesophilous broad-leaved ash-maple scree and ravine forests of the Balkan Peninsula

FAG-05E *Ostryo carpinifoliae-Tilion platyphylli* (Košir et al. 2008) Čarni in Willner et al. 2016

Submediterranean xero-thermophilous broad-leaved scree and ravine forests of the Balkan Peninsula

FAG-05F *Tilio pseudorubrae-Ostryion carpinifoliae* S. Brullo et al. 2001

Submediterranean broad-leaved scree and ravine forests of the Southern Apennine Peninsula

- *Lauro nobilis-Tilion platyphylli* Biondi et al. 2008 (5)
- *Lauro nobilis-Tilion platyphylli* Biondi et al. 2013 (syntax.syn.)

FAG-06 *Rhododendro pontici-Fagetalia orientalis* Passarge 1981

Euxino-Hyrcanian oriental beech forests

- *Fagetalia orientalis* Soó 1964 (3b)
- *Rhododendro pontici-Fagetalia orientalis* Quézel et al. 1980 (5)
- *Fagetalia orientalis* Korzhenevskii et Kiselev 1982 (2b)
- *Rhododendro pontici-Fagetalia orientalis* Quézel et al. 1992 (31)
- *Dentario quinquefoliae-Fagetalia* Didukh 1996 (5)

FAG-06A *Fagion orientalis* Soó 1964

Oriental beech forests of the southeastern Balkan Peninsula, the Caucasus, Northern Anatolia and the Colchis region

fag18 The name *Fagion orientalis* was validly published in Soó (1964) on the basis of the '*Lauroceraso-Fagetum orientalis bulgaricum*' Soó 1964 *nom. illeg.* (ICPN art. 34). The latter association was described validly in the same publication (on pages 56-59) by presenting a synoptic table (showing differentiated constancy-classes) based on data by I. Penew. (LM, WW)

- *Fagion orientalis* Borza et Boşcaiu 1965 (2b)
- *Carpino-Fagion orientalis* Zohary 1973 (2b, 3e)
- *Fagion orientalis colchicum* Zohary 1973 (2b)
- *Fagion orientalis euxinum* Zohary 1973 (2b)
- *Querco-Fagion orientalis* Zohary 1973 (2b)
- *Lauroceraso-Fagion orientalis* Horvat et al. 1974 (2b)
- *Rhododendro pontici-Fagion orientalis* Horvat et al. 1974 (2b)
- *Fagion orientalis* Quézel et al. 1980 (5)
- *Rhododendro pontici-Fagion orientalis* Horvat et al. ex Passarge 1981 (syntax.syn.)
- *Vaccinio-Fagion orientalis* Passarge 1981 (3g)

fag19 This alliance was coined to accommodate the acidophilous beech forests of the Caucasus. However, the four relevés included in the original diagnosis contain also several mesophilous species such as *Galium odoratum*, *Aruncus dioicus* and *Daphne mezereum*. There is no evidence in the literature for the existence of real acidic oriental beech forests, comparable with the *Luzulo-Fagion sylvaticae*. (WW)

- *Crataego pentagynae-Fagion orientalis* Quézel et al. 1992 (syntax.syn.)
- *Fagion orientalis* Quézel et al. 1992 (31)
- *Carpino-Fagion orientalis* Kavgacı et al. 2012 (syntax.syn.)
- *Violo odoratae-Fagion orientalis* Kavgacı et al. 2012 (syntax.syn.)

FAG-06B *Dentario quinquefoliae-Fagion* Didukh 1996

Mesic Crimean beech forests on basic soils

fag20 Recent genomic studies suggest that *Fagus* occurring in Crimea (at a specific level called *F. taurica* Popl.) might be of a hybrid origin, involving *Fagus sylvatica s.str.* and *F. orientalis* as putative parents. According to Gömöry & Paule (2010), *F. taurica* is evolutionary closer to *F. orientalis* than to *F. sylvatica s.str.* In any case, the Crimean *Fagus* forests appear to be ecologically and biogeographically closer to the *Rhododendro pontici-Fagetalia orientalis* then to the *Fagetalia sylvaticae*. (LM) This alliance should be classified in the *Fagetalia sylvaticae* Pawłowski 1928. (YD)

- *Fagion tauricum* Borhidi in Soó 1964 (2b)
- *Fagion orientalis* Korzhenevskii et Kiselev 1982 (2b, 5)

PUB *Quercetea pubescentis* Doing-Kraft ex Scamoni et Passarge 1959

Oak, mixed deciduous and conifer open forests of warm regions in the cool-temperate nemoral zone of Central and Southern Europe and in the supramediterranean belt of the Mediterranean, Asia Minor and Middle East

pub01 Several authors (e.g. Willner & Grabherr 2007; Trinajstić 2008; Rivas-Martínez et al. 2011) prefer to

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include the content of this class within the '*Querco-Fagetea*'. (LM)

- *Quercetea pubescentis* Doing-Kraft 1955 (2b)
- *Quercetea pubescentis* Oberd.1957 (3b)
- *Quercetea pubescenti-petraeae* Jakucs 1960 (29c)
- *Peucedano-Quercetea* Passarge 1968 (Regionalklasse) (3d)
- *Peucedano-Quercetea* Oberd. et Doing ex Passarge 1968 (syntax.syn.)
- *Peucedano-Quercetea* Oberd. et Doing ex Passarge et G. Hofmann 1968 (31)
- *Peucedano-Quercetea* Passarge in Passarge et G. Hofmann 1968 (Regionalklasse) (3d)
- *Quercetea petraeae-cerris* Lakušić et al. 1979 (2b, 5)
- *Quercetea petraeae-pubescentis* Lakušić et al. 1979 (2b)

PUB-01 *Quercetalia pubescenti-petraeae* Klika 1933

Oak forests of the warm cool-temperate regions in the nemoral zone of Central and Southern Europe and relic supramediterranean fir-pine and oak forests of the Mediterranean

pub02 This order comprises forests dominated by oaks (*Q. pubescens, Q. cerris, Q. petraea, Q. frainetto, Q. faginea* and others), hornbeam (*Carpinus orientalis*), hop hornbeam (*Ostrya carpinifolia*) as well as Mediterranean relict fir species (*A. cephalonica* and *A. pinsapo*). The distribution of the order spans Spain in the West and Crimea in the East and its communities occur on both acidic and calcareous substrates. The large number of alliances and the obvious syntaxonomic heterogeneity of this order call for a profound pan-European syntaxonomic revision. (LM, WW)

- *Quercetalia pubescentis* Br.-Bl. 1931 (2b)
- *Quercetalia pubescentis* Tx. 1931 (2b)
- *Quercetalia pubescenti-sessiliflorae* Quantin 1935 (31)
- *Fraxino orni-Ostryetalia* Jakucs 1959 (3b)
- *Quercetalia pubescentis medioeuropeae* Horvat 1959 (2b)
- *Fraxino orni-Cotinetalia* Jakucs 1960 (29c)
- *Quercetalia petraeae-pubescentis* Jakucs 1960 (31)
- *Brachypodio-Quercetalia petraeae* Passarge 1968 (29c)
- *Brachypodio-Quercetalia petraeae* Hofmann in Passarge et G. Hofmann 1968 (31)
- *Festuco-Quercetalia robori-petraeae* Passarge 1968 (34c)
- *Festuco-Quercetalia robori-petraeae* Passarge et G. Hofmann 1968 (34c)
- *Quercetalia robori-pubescentis* Förster 1979 (29c)
- *Ostryo-Carpinetalia orientalis* Lakušić et al. 1982 (2b, 5)
- *Carpino-Melicetalia uniflorae* Ubaldi et al. 1986 (2b)
- *Sorbo ariae-Quercetalia lanuginosae* Gillet 1986 (1)
- *Lathyro nigri-Quercetalia cerridis* Ubaldi 1988 (2b, 5)
- *Lathyro veneti-Carpinetalia* Ubaldi et al. 1990 (syntax.syn.)
- *Sorbo ariae-Quercetalia lanuginosae* Gillet ex Julve 1991 (*sensu* Julve 1993) (orig.form) (2b, *mut.superfl.*)
- *Quercetalia cerridis* Borhidi in Borhidi et Kevey 1996 (syntax.syn.)

GROUP OF COOL-TEMPERATE ALLIANCES

PUB-01A *Quercion petraeae* Issler 1931

Thermophilous Central European acidophilous oak forests

- *Quercion petraeae* Zólyomi et Jakucs ex Jakucs 1960 (31)
- *Potentillo albae-Quercion petraeae* Jakucs in Zólyomi 1967 (syntax.syn.)
- *Dactylido-Quercion* Passarge 1968 (3b)
- *Dactylido-Quercion* Hofmann in Passarge et G. Hofmann 1968 (syntax.syn.)
- *Peucedano-Quercion* G. Hofmann in Passarge 1968 (2b)
- *Peucedano-Quercion* G. Hofmann in Passarge et G. Hofmann 1968 (syntax.syn.)
- *Sileno-Quercion* G. Hofmann in Passarge 1968 (syntax.syn.)
- *Trifolio-Quercion petraeae-roboris* Förster 1979 (3g, 5)

PUB-01B *Quercion pubescenti-petraeae* Br.-Bl. 1932 *nom. mut.*

Thermophilous Central European calciphilous oak forests

pub03 A proposal to mutate the name was presented by Chytrý (1997) and Willner & Grabherr (2007: 228) (see also Willner et al. 2011). (LM)

- *Quercion pubescenti-sessiliflorae* Br.-Bl. 1931 (2b, 3f)
- *Quercion pubescenti-sessiliflorae* Br.-Bl. 1932 (orig.form) (44)
- *Fruticiquercion pubescentis* Rübel 1933 (orig.form) (2b)
- *Dictamno-Sorbion* Knapp 1942 (1)
- *Buxo-Quercion pubescentis* Zólyomi et Jakucs in Jakucs 1960 (29c)
- *Euphorbio-Quercion* G. Hofmann in Passarge 1968 (syntax.syn.)
- *Euphorbio-Quercion* G. Hofmann in Passarge et G. Hofmann 1968 (31)
- *Aceri opali-Quercion lanuginosae* Gillet 1986 (1)

PUB-01C *Aceri tatarici-Quercion* Zólyomi 1957

Thermophilous oak forests on deep soils in the forest-steppe zone of the Pontic-Pannonian region

- *Quercion pedunculiflorae* Popescu et al. 1979
- *Quercion pedunculiflorae* Dolţu et al. 1980 (5)
- *Convallario majalis-Quercion roboris* Shevchyk et Solomakha in Shevchyk et al. 1996 (syntax.syn.)

PUB-01D *Lathyro pisiformis-Quercion roboris* Solomeshch et Grigoriev in Willner et al. 2015

Thermophilous oak forests on fertile dark grey soils of the Southern Urals

- *Pruno-Quercion roboris* Schubert et al. 1979 (5)
- *Lathyro pisiformis-Quercion roboris* Solomeshch et al. 1989 (1)

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GROUP OF SUBMEDITERRANEAN ALLIANCES ON CALCAREOUS SUBSTRATES

PUB-01E *Aceri granatensis-Quercion fagineae* (Rivas Goday, Rigual et Rivas-Mart. 1960) Rivas-Mart. 1987

Supramediterranean submediterranean mesophytic oak and maple forests of the Iberian Peninsula and the Balearic Islands

PUB-01F *Fraxino orni-Ostryion* Tomažič 1940

Amphiadriatic mesic calcareous submediterranean (sub)montane and inland oak and hop-hornbeam forests on shallow soils

- *Orneto-Ostryon* Tomažič 1940 (orig.form)
- *Ostryo-Carpinion orientalis* Horvat 1959 (29c)
- *Ostryion carpinifoliae* Lakušić 1975 (2b)
- *Laburno-Ostryion* Ubaldi 1980 (5)
- *Seslerio-Ostryion* (Tomažič 1940) Lakušić et al. 1982 (5)
- *Laburno-Ostryion* Ubaldi 1995 (syntax.syn.)

PUB-01G *Carpinion orientalis* Horvat 1958

Amphiadriatic low-altitude calcareous thermophilous oak and oriental hornbeam forests

- *Carpinion orientalis* Horvat 1954 (2b)
- *Carpinion orientalis* Horvatić 1957 (2b)
- *Querco-Carpinion orientalis* Csűrös et al. 1968 (syntax.syn.)
- *Lauro-Quercion pubescentis* Ubaldi 1988 (syntax.syn.)

PUB-01H *Syringo-Carpinion orientalis* Jakucs (1959) 1960

Submediterranean thermophilous oriental-hornbeam forests of the Central and Southern Balkans

- *Paliuro-Carpinion orientalis* Cristurean et Ţeculescu 1968 (syntax.syn.)

PUB-01I *Elytrigio nodosae-Quercion pubescentis* Didukh 1996

Crimean submediterranean thermophilous oak woods

- *Carpino orientalis-Quercion pubescentis* Korzhenevsky et Shelyag-Sosonko 1983 (2b, 5)

PUB-01J *Campanulo sibiricae-Pinion brutiae* Litvinskaya et Postarnak ex Mucina *all. nov. hoc loco*

Western Caucasian submediterranean thermophilous Pinus brutia forests on calcareous substrates

pub04 This unit was described under name *'Campanulo longistylae-Pinion pithyusae'* by Litvinskaya and Posternak (2002). Formally (missing *'typus' expressis verbis*) all three associations (*Campanulo longistylae-Pinetum pithyusae, 'Epymedio colchici-Pinetum pithyusae'* and *Trachymeno orientalis-Quercetum iberici*) were invalidly published. The *Epimedio colchici-Pinetum pithyusae* has been selected as the 'nomenklaturni tip' (= nomenclature type in Russian) of the *Campanulo longistylae-Pinion pithyusae*, however again the authors failed to introduce the nomenclature type as *'typus' expressis verbis*. It is therefore I validate the description of the *Epimedio colchici-Pinetum pithyusae* by re-assigning the relevé on page 256 in Litvinskaya & Postarnak (2002) as the *holotypus hoc loco* of the association and assign this validly described association (*Epimedio colchici-Pinetum pithyusae* Litvinskaya et Postarnak ex Mucina in Mucina et al. 2016) as the *holotypus (hoc loco)* of the *Campanulo sibiricae-Pinion brutiae* Litvinskaya et Postarnak ex Mucina *all. nov. hoc loco*. (*Campanula longistyla* Fomin is synonymous with *C. sibirica* L., and *Pinus pithyusa* Steven is synonymous with *P. halepensis* subsp. *brutia* (Ten.) Holmboe) The relationship of these relict warm-temperate (submediterranean) *P. brutia* forests (from calcareous substrates at low-altitudes in the northwestern parts of the Transcaucasian Colchis region) and the true mediterranean *P. brutia* forest (see *Pinetalia halepensis*) will be handled elsewhere. (LM)

- *Campanulo longistylae-Pinion pithyusae* Litvinskaya et Postarnak 2002 (5)

GROUP OF SUBMEDITERRANEAN ALLIANCES ON SILICEOUS SUBSTRATES

PUB-01K *Physospermo-Quercion petraeae* A.O. Horvát 1976

Thermophilous chestnut and oak forests on neutral and acidic substrates of insubrian Northern Italy

- *Castaneion* Rübel 1933 (orig.form) (2b)
- *Erythronio-Quercion petraeae* Ubaldi 1988 (2b)
- *Erythronio-Quercion petraeae* Ubaldi et al. 1990 (29c)

PUB-01L *Crataego laevigatae-Quercion cerridis* Arrigoni 1997

Submediterranean acidophilous thermophilous oak forests of the central and southern regions of the Apennine Peninsula

pub05 For a solution to the complicated syntaxonomy and nomenclature of this syntaxon consult Di Pietro et al. (2010). (LM)

- *Quercion cerridis* Avena et Bruno 1975 (2b)
- *Lonicero etruscae-Quercion pubescentis* Arrigoni et Foggi 1988 (2b)
- *Teucrio siculi-Quercion cerridis* Ubaldi 1988 (2b)
- *Lonicero etruscae-Quercion pubescentis* Arrigoni et Foggi ex Arrigoni et al.1990 (2b)
- *Lathyro montani-Quercion cerridis* Scoppola et Filesi 1995 (2b)
- *Lathyro montani-Quercion cerridis* Scoppola et Filesi 1998 (syntax.syn.)
- *Mespilo-Carpinion betuli* Ubaldi 2003 (5)
- *Teucrio siculi-Quercion cerridis* Ubaldi 2003 (29c)
- *Physospermo verticillati-Quercion cerridis* Biondi et al. 2008 (5)
- *Physospermo verticillati-Quercion cerridis* Biondi et al. 2013 (syntax.syn.)

PUB-01M *Pino calabricae-Quercion congestae* S. Brullo et al. 1999

Submediterranean montane Siculo-Calabrian pine-oak woods

- *Festuco exaltatae-Quercion humilis* Ubaldi 2003 (syntax.syn.)
- *Oenantho pimpinelloidis-Quercion humilis* Ubaldi (2003) 2008 (5)

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PUB-01N *Quercion confertae* Horvat 1958
Thermophilous deciduous oak forests on slightly acidic deep soils of the Central Balkans
- *Quercion confertae* Horvat 1954 (2b)
- *Quercion frainetto* Horvat 1958 *nom. mut. propos.* (45)

pub06 The name *Quercus conferta* Kit. has been used in the taxonomic literature for the last few decades only as a synonym of *Quercus frainetto* Ten. Thus, the name *Quercion confertae* has been updated in Bergmeier & Dimopoulos (2008) to the *Quercion frainetto* (*nomen mutatum propositum* following the ICPN art. 45) – a name that has been used in geobotanical literature since Horvat et al. (1974: 235). (EB)
- *Quercion frainetto-cerridis* Horvat 1959 (29)

PUB-01O *Quercion petraeo-cerridis* Lakušić et B. Jovanović in B. Jovanović et al. ex Čarni et Mucina 2015
Thermophilous montane oak forests of the Central Balkans
- *Quercion cerris-macedonicae* Horvat 1938 (3b)
- *Quercion petraeae-cerridis* Lakušić et B. Jovanović in B. Jovanović et al. 1980 (2b)
- *Quercion trojani* Redžić 2000 (2b)
- *Quercion petraeae-cerridis* Lakušić et B. Jovanović ex Čarni et al. 2009 (2b)

PUB-01P *Melitto albidae-Quercion* Barbero et Quézel 1976
Thermophilous deciduous oak forests on slightly acidic deep soils of the Southern Balkans

GROUP OF ALLIANCES OF RELICT MEDITERRANEAN FORESTS

PUB-01Q *Paeonio broteroi-Abietion pinsapo* (Rivas-Mart. 1987) Rivas-Mart. et al. 2002
Relict Betic (Southern Iberian) fir forests on dolomitic and ultramafic substrates
- *Paeonio broteroi-Abietion pinsapo* Rivas-Mart. 1982 (2b)

PUB-01R *Lathyro veneti-Taxion baccatae* Čarni et Mucina 2015
Relict mixed deciduous oak and yew forests of Corsica and Sardinia
- *Lathyrion veneti* Gamisans 1975 (29b)

PUB-01S *Abietion cephalonicae* Horvat et al. 1974
Relict supramediterranean Hellenic fir and black pine montane forests
- *Abietion borisii-regis* Em in B. Jovanović et al. 1986 (2b)
- *Abieti-Pinion* Barbero et Quézel 1976 (2b)
- *Abieti cephalonicae-Pinion pallasianae* Barbero et Quézel ex Quézel et al. 1992 (phantom)
- *Abieti cephalonicae-Pinion pallasianae* Barbero et Quézel ex Quézel et al. 1993 (2b)

PUB-01T *Quercion macrolepidis* Zohary ex Di Pietro et al. *ined.*
Relict mesomediterranean deciduous oak forests of the Eastern Mediterranean
- *Quercion ithaburensis* Zohary 1955 (2b)
- *Quercion macrolepidis* Zohary 1973 (2b)

PUB-02 *Querco-Cedretalia libani* Barbero et al. 1974
Relict supramediterranean cedar woods of Southern Anatolia, Syria, Lebanon and Cyprus

PUB-02A *Querco-Cedrion libani* Barbero et al. 1974
Relict supramediterranean cedar woods of Cyprus

QUE *Quercetea robori-petraeae* Br.-Bl. et Tx. ex Oberd. 1957
Acidophilous oak and oak-birch forests on nutrient-poor soils of Europe

que01 Some authors (e.g. Bardat et al. 2004; Willner & Grabherr 2007; Rivas-Martínez et al. 2011) prefer to include the contents of this class within the '*Querco-Fagetea*'. (LM, WW) For the nomenclature related to the name see Willner et al. (2015). (WW, LM, JP, JPT)
- *Quercetea robori-sessiliflorae* Quantin 1935 (phantom)
- *Quercetea robori-sessiliflorae* Br.-Bl. et Tx. 1943 (2b)

que02 Some co-authors (JP, WW) regard this name as validly published (see Willner et al. 2015 for details). (WW)
- *Querco-Ulicetea* Lebrun et al. 1949 p.p.
- *Robori-Quercetea* Rothmaler 1954 (orig.form) (2b)
- *Querco-Piceetea* Doing 1962 p.p. (*typo excl.*) (29c)

que03 Doing (1962: 23) suggested unifying the *Vaccinio-Piceetea*, *Vaccinietea uliginosi* and *Quercetea robori-petraeae* into one class for which he proposed the name '*Querco-Piceetea*'. By referring to the *Vaccinio-Piceetalia* Br.-Bl. et al. 1939 the proposed class name became a *nomen superfluum* with respect to the *Vaccinio-Piceetea*. (JP, WW)
- *Deschampsio-Quercetea robori-petraeae* Passarge 1968 (34c)
- *Deschampsio-Quercetea robori-petraeae* Passarge et G. Hofmann 1968 (34c)
- *Quercetea petraeae-cerris* Lakušić et al. 1979 p.p. (2b, 5)

QUE-01 *Quercetalia roboris* Tx. 1931
Acidophilous oak forests on nutrient-poor soils of Europe

que04 Redžić (2007) classified this order within the *Quercetea pubescentis*. (LM)
- *Quercetalia robori-sessiliflorae* Tx. 1937 (29)
- *Quercetalia robori-petraeae* Tx. 1937 *nom. mut. propos.* (*mut. superfl.*)
- *Pteridio-Quercetalia* Scamoni et Passarge 1959 (syntax.syn.)
- *Pino-Quercetalia* Soó 1962 *nom. dubium* (38)

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que05 This name is based on the *Pino-Quercion* Medwecka-Kornaś et al. 1959 and the *Pino-Quercetum* Kozłowska 1925 (ICPN art. 20). The type relevé of the latter association was made in an artificial pine stand replacing natural oak-hornbeam forest. (JPT, WW)

- *Pino-Quercetalia* Ružička 1964 (31)
- *Dicrano-Quercetalia robori-petraeae* Passarge 1968 (34c)
- *Dicrano-Quercetalia* Passarge et G. Hofmann 1968 (syntax.syn.)
- *Eu-Dicrano-Quercetalia* Passarge 1968 (Regionalordnung) (3d)
- *Eu-Dicrano-Quercetalia* Passarge et G. Hofmann 1968 (Regionalordnung) (3d)
- *Eu-Melampyro-Quercetalia* Passarge et G. Hofmann 1968 (Regionalordnung) (3d)
- *Melampyro-Quercetalia* Passarge 1968 (syntax.syn.)
- *Melampyro-Quercetalia* Passarge et G. Hofmann 1968 (31)
- *Molinio-Quercetalia robori-petraeae* Passarge 1968 (34c)
- *Molinio-Quercetalia* Passarge et G. Hofmann 1968 (syntax.syn.)
- *Castaneo-Quercetalia* P. Fukarek 1969 (2b)
- *Betulo pendulae-Quercetalia petraeae* Gillet 1986 (1)

TEMPERATE GROUP OF ALLIANCES

QUE-01A *Hymenophyllo-Quercion petraeae* Pallas 2000

Hyperoceanic humid acidophilous oak forests on nutrient-poor soils of Ireland

QUE-01B *Quercion roboris* Malcuit 1929

Temperate atlantic and subatlantic acidophilous oak forests on nutrient-poor soils of Western Europe

que06 JP prefers to separate northern and southern temperate forests at the level of alliances (Pallas in Bohn et al. 2003: 250–253). However, the floristic differences between these two units (*Molinio-Quercion roboris* and *Quercion roboris s.str.*, respectively) are rather weak and perhaps more appropriate to be recognized at the suballiance level. (WW)

- *Quercion robori-sessiliflorae* Br.-Bl. 1931 (29c)
- *Quercion robori-sessiliflorae* Br.-Bl. 1932 (29c)
- *Quercion roboris acidiphilum* Schmid 1936 (34a)
- *Molinio-Quercion roboris* Scamoni et Passarge 1959 (syntax.syn.)
- *Dicrano-Quercion* Passarge in Scamoni 1963 (2b, 3b)
- *Dicrano-Quercion* Passarge et G. Hofmann 1968 (syntax.syn.)
- *Dicrano-Quercion petraeae* Passarge 1968 (Regionalverband) (3d)
- *Dicrano-Quercion roboris* Passarge 1968 (Regionalverband) (3d)
- *Lysimachio-Quercion roboris* Passarge 1968 (2b)
- *Lysimachio-Quercion roboris* Passarge et G. Hofmann 1968 (syntax.syn.)
- *Melampyro-Quercion petraeae* Passarge 1968 (Regionalverband) (3d)
- *Melampyro-Quercion petraeae* Passarge in Passarge et G. Hofmann 1968 (Regionalverband) (3d)
- *Melampyro-Quercion roboris* Passarge 1968 (Regionalverband) (3d)
- *Melampyro-Quercion roboris* Passarge in Passarge et G. Hofmann 1968 (Regionalverband) (3d)
- *Molinio-Quercion petraeae* Passarge 1968 (Regionalverband) (3d)
- *Molinio-Quercion roboris* Passarge 1968 (Regionalverband) (3d)
- *Betulo pendulae-Quercion petraeae* Gillet 1986 (1)
- *Hieracio lachenalii-Quercion petraeae* Pallas 1996 (syntax.syn.)

QUE-01C *Agrostio-Quercion petraeae* Scamoni et Passarge 1959

Temperate acidophilous oak forests on nutrient-poor soils of Central and Eastern Europe

- *Pino-Quercion* Ružička 1964 (31)
- *Genisto germanicae-Quercion* Neuhäusl et Neuhäuslová-Novotná 1967 (syntax.syn.)
- *Agrostio-Quercion petraeae* Passarge 1968 (Regionalverband) (3d)
- *Agrostio-Quercion petraeae* Passarge in Passarge et G. Hofmann 1968 (Regionalverband) (3d)
- *Agrostio-Quercion roboris* Passarge 1968 (Regionalverband) (3d)
- *Agrostio-Quercion roboris* Passarge in Passarge et G. Hofmann 1968 (Regionalverband) (3d)
- *Luzulo-Quercion roboris* Debreczy et Hargittai 1971 (3f)
- *Veronico officinalis-Quercion* Pop 1971 (syntax.syn.)

que07 Pallas (1996) considers this name to be invalid. (WW)

- *Vaccinio myrtilli-Quercion petraeae* Pallas 1996 (syntax. syn.)
- *Vaccinio myrtilli–Quercion roboris* Bulokhov et Solomeshch 2003 (syntax.syn.)

SUBMEDITERRANEAN GROUP OF ALLIANCES

QUE-01D *Quercion pyrenaicae* Rivas Goday ex Rivas-Martínez 1965

Acidophilous oak forests on nutrient-poor soils of the Northern Iberian Peninsula

que08 JP prefers to separate the southern temperate (*Quercion robori-pyrenaicae*) from the submediterranean (*Quercion pyrenaicae s.str.*) forests at the level of alliances (Pallas in Bohn et al. 2003: 250–253). We follow Rivas-Martínez et al. (2001) who considered these two units only at the suballiance level. (WW)

- *Quercion broteroanae* Br.-Bl., Silva, Rozeira et Fontes in Silva et al. 1950 (43)

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- *Quercion pyrenaicae* Rivas Goday 1954 (3b)
- *Quercion occidentale* Br.-Bl., Silva et Rozeira 1956 (34a)
- *Quercion robori-pyrenaicae* (Br.-Bl., Silva et Rozeira 1956) Rivas-Mart. 1975 (syntax.syn.)
- *Quercion occidentali-pyrenaicae* Julve 1993 (2b)

QUE-01E *Castaneo-Quercion petraeae* Soó 1964

Acidophilous chestnut-oak forests on nutrient-poor soils of south-eastern Europe

- *Castaneo-Quercion petraeae* Soó 1962 (3b)
- *Calluno-Quercion* P. Fukarek in Fabijanić et al. 1963 (3b)
- *Quercion moesiacum* P. Fukarek 1969 (2b)

QUE-02 *Lonicero periclymeni-Betuletalia pubescentis* Willner et Mucina in Willner et al. 2016

Acidophilous atlantic birch forests on nutrient-poor soils of Western Europe

que09 Atlantic birch forests are classified as a separate order since they appear to be seral (e.g. in avalanche channels) or secondary to the forest of the *Quercetalia roboris*. (WW)

QUE-02A *Betulion fontquerio-celtibericae* Rivas-Mart. et M. Costa in Rivas-Mart. et al. 2002

Orocantabro-atlantic and oroiberian perhumid birch forests on siliceous, nutrient-poor substrates of the Northern Iberian Peninsula

que10 The currently accepted taxonomic concept of *Betula fontqueri* is *B. pendula* var. *fontqueri*, while *Betula celtiberica* is included into the variability of *Betula pubescens* var. *pubescens*. (LM)

- *Betulion fontquerio-celtibericae* Rivas-Mart. et al. 2001 (5)

QUE-02B *Lonicero periclymeni-Betulion pubescentis* Géhu 2006

Atlantic birch forests on nutrient-poor soils of the North Sea seaboards and northwestern France

- *Ligustro vulgaris-Betulion pubescentis* Géhu 2006 (syntax.syn.)

INTRAZONAL SCRUB AND WOODLANDS OF THE NEMORAL ZONE

RHA *Crataego-Prunetea* Tx. 1962 *nom. conserv. propos.*

Scrub and mantle vegetation seral or marginal to broad-leaved forests in the nemoral zone and the submediterranean regions of Europe

rha01 The explanation of the nomenclature issues surrounding the names *Rhamno-Prunetea, Crataego-Prunetea* and *Sambucetea* will be published in at a later stage. (LM)

- *Rhamno-Prunetea* Rivas Goday et Borja Carbonell 1961 (3b)
- *Rhamno-Prunetea* Rivas Goday et Borja Carbonell ex Tx. 1962 (3b)
- *Sambucetea* Doing 1962 (syntax.syn.)
- *Rubo-Sambucetea* Passarge in Scamoni 1963
- *Sambuco-Prunetea* Jurko 1964 (2b)
- *Rhamno-Prunetea* Rivas Goday et Borja Carbonell ex Westhoff 1967 (syntax.syn.)
- *Salici-Sambucetea* Oberd. in Oberd. et al. 1967 (2b, 3b)
- *Urtico-Sambucetea* Doing ex Passarge et G. Hofmann 1968 (syntax.syn.)
- *Violo-Berberidetea* Passarge in Passarge et G. Hofmann 1968 (3b)
- *Paliuretea* Trinajstić 1977 (phantom)
- *Paliuretea* Trinajstić 1978 (syntax.syn.)
- *Amygdaletea nanae* Golub 1990 (5)

GROUP OF COOL TEMPERATE ORDERS

RHA-01 *Prunetalia spinosae* Tx. 1952

Scrub and mantel vegetation seral or marginal to broad-leaved forests in the nemoral zone of Europe

- *Corylo-Prunetalia* Tx. in P. Fukarek 1968 (2b)
- *Prunetalia fruticosae* P. Fukarek 1968 (2b)
- *Urtico-Crataegetalia* Passarge in Passarge et G. Hofmann 1968 (syntax.syn.)
- *Coryletalia avellanae* P. Fukarek 1969 (2b)
- *Pruno-Rubetalia* Weber 1974 (syntax.syn.)
- *Berberido-Prunetalia* (Tx. 1952) Passarge 1978 (29c)
- *Amygdaletalia nanae* Golub 1990 (5)
- *Berberidetalia vulgaris* de Foucault et Julve in Julve 1993 (3b)
- *Tamo communis-Rubetalia inermis* de Foucault et Julve in Julve 1993 (3b)
- *Betulo pendulae-Populetalia tremulae* Rivas-Mart. et M. Costa 1998 (2b)
- *Berberidetalia vulgaris* de Foucault et Julve 2001 (5, 8)
- *Tamo communis-Rubetalia ulmifolii* de Foucault et Julve 2001 (5, 8)

GROUP OF ALLIANCES OF THE NEMORAL ZONE

RHA-01A *Berberidion vulgaris* Br.-Bl. ex Tx. 1952 *nom. conserv. propos.*

Southern temperate and submediterranean thermophilous scrub of Southern and Central Europe

rha02 For details of this conservation proposal see Willner et al. (2015a). Instead of conserving the name *Berberidion* Br.-Bl. ex Tx. 1952 (a later homonym) it is suggested to conserve the name *Berberidion* Br.-Bl. 1950 with a conserved type, a possibility that is not available at present though this tool would be implemented in the next edition of the ICPN. (JPT)

- *Prunion spinosae* Soó 1931 *nom. ambig. rejic. propos.* (36)

rha03 Sádlo & Chytrý in Chytrý (2013: 87, 92–93) suggested rejecting this name as a *nomen ambiguum*. (LM)

- *Berberidion* Br.-Bl. 1950 *nom. conserv. propos.* (31, *conserv.inval.*)

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rha04 The name was suggested for conservation on basis of a decision taken by Nomenclature Commission (Willner et al. 2011). (LM)

- *Carpino-Berberidion* Doing 1963 (2b)
- *Sambuco-Berberidion* Doing 1963 (2b)
- *Crataego-Prunion* T. Müller 1974 (phantom)
- *Crataego-Prunion* T. Müller ex Korneck 1974 (syntax. syn.)
- *Prunion spinosae* P. Fukarek et Fabijanić 1968 (3b)
- *Ligustro-Crataegion* Passarge 1978 (2b)
- *Amelanchierion ovalis* Arlot 1985 (2b)
- *Ligustro-Prunion spinosae* Arlot 1985 (2d, 5)
- *Clematido vitalbae-Acerion campestris* Felzines in Royer et al. 2006 (syntax.syn.)
- *Lonicero xylostei-Berberidion hispanicae* ssp. *seroi* de Foucault et Julve 2001 (orig.form) (5)
- *Rhamno alpini-Berberidion vulgaris* Rivas-Mart. in Rivas-Mart. et al. 2011 (29)

rha05 Rivas-Martínez et al. (2011: 333) introduce a new (superfluous) name for this unit because of the alleged illegitimity of the type association *Corylo-Populetum* Br.-Bl. 1950. Firstly, illegitimity of its name does not preclude a syntaxon to be chosen as *typus,* and secondly, the name *Berberidion vulgaris* Br.-Bl. ex Tx. 1952 was suggested for conservation by the decision of the Nomenclature Commission (Willner et al. 2011). (LM)

- *Ribeso alpini-Juniperion communis* Cutini et al. 2002 (syntax.syn.)
- *Roso arvensis-Crategion laevigatae* Ubaldi 2011 (syntax.syn.)

RHA-01B *Amelanchiero-Buxion* O. de Bolòs et Romo in Romo 1989

Pyrenean and Western Catalonian submediterranean subxeric scrub

RHA-01C *Lonicero arboreae-Berberidion hispanicae* O. de Bolòs 1954

Supra- and oromediterranean scrub on base-rich substrates of the Betic region (Southern Iberia) and the North African mountain ranges

- *Lonicero arboreae-Berberidion australis* (O. de Bolòs 1954) Rivas Goday 1964 (29)
- *Lonicero splendidae-Berberidion hispanicae* de Foucault et Julve 2001 (5, 8)

RHA-01D *Urtico-Crataegion* Passarge et G. Hofmann 1968

Mesophilous hedges and scrub on mesotrophic base-rich soils of northwestern Europe

- *Rubion subatlanticum* Tx. 1952 p.p. (34a)
- *Rubo-Prunion spinosae* (Tx. 1952) T. Müller in Oberd. et al. 1967 (29)

rha06 Müller (in Oberdorfer et al. 1967: 54) suggested a new name for the '*Rubion subatlanticum* Tx. 1952', however failed to make clear bibliographic reference the protologue of the latter alliance. Therefore the introduction of a *nomen novum* remained illegitimate. (LM)

- *Carpino-Prunion spinosae* Weber 1974 (syntax.syn.)
- *Ribeso alpini-Viburnion lantanae* de Foucault et Julve 2001 (5)

RHA-01E *Astrantio-Corylion avellanae* Passarge 1978

Hazel scrub on nutrient-rich soils in the submontane and montane belts of Western, Central and southeastern Europe

rha07 In case the *Corylo avellanae-Populion tremulae* would be rejected as *nomen ambiguum,* this name would apply as the valid and current one. (LM)

- *Corylo avellanae-Populion tremulae* Br.-Bl. 1961 (2b)
- *Populo tremulae-Corylion avellanae* Br.-Bl. 1961 *nom. conserv. propos. et nom. invers. propos.* (2b, *conserv.inval., invers. superfl.*)

rha08 Willner & Grabherr (2007: 225) proposed inversion and conservation of this syntaxon name. Both proposals should be considered invalid since the concerned name (*Corylo avellanae-Populion tremulae* Br.-Bl. 196) is invalidly published. (LM)

- *Corylo avellanae-Populion tremulae* Br.-Bl. ex Jurko 1964 *nom. ambig. rejic. propos.* (36)

rha09 The nomenclatural complexity surrounding this syntaxonomic concept has been elaborated in detail by Willner & Grabherr (2007: 225). (LM) MC does not support this syntaxonomic concept as it is very heterogeneous, including both thermophilous scrub and scrub of forest clearings hence it should be partly a synonym of the *Berberidion,* partly of the *Sambuco-Salicion*. (MC) There is also apparent divergence of opinions about the original (invalid) concept of the alliance (Braun-Blanquet 1961). Jurko (1964) validated this concept in the context of the *Rhamno-Prunetea* communities of Central Europe, while de Bolòs (1973) used and validated this name for an apparently different syntaxonomic concept valid for the Iberian Peninsula. It is therefore that this name should be rejected as a typical case of *nomen ambiguum*. (LM)

- *Corylion avellanae* P. Fukarek et Fabijanić 1968 (3b)
- *Crataego-Corylion* P. Fukarek 1969 (2b, 3b)
- *Lonicero nigrae-Corylion avellanae* de Foucault et Julve in Julve 1993 (2d, 3b)
- *Senecioni ovati-Corylion avellanae* Weber 1997 (syntax. syn.)
- *Corylo avellanae-Populion tremulae* (Br.-Bl. ex O. de Bolòs 1973) Rivas-Mart. et M. Costa 1998 *nom. ambig. rejic. propos.* (36)

rha10 This name should be rejected as *nomen ambiguum* for the same reason as given in Remark *rha09*. Rivas-Martínez et al. (2011: 387) considered this particular name as a valid concept and used it to typify the *Betulo pendulae-Populetalia tremulae*. (LM)

- *Lonicero nigrae-Corylion avellanae* (Braun-Blanquet 1961) de Foucault et Julve 2001 (2b, 5)

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- *Corylo avellanae-Populion tremulae* (Br.-Bl. ex Theurillat in Theurillat et al. 1995) Géhu in Bardat et al. 2004 *nom. ambig. rejic. propos.* (3b, 36)

rha11 This name should be rejected as *nomen ambiguum* for the same reason as given in Remark *rha09*. (LM)

RHA-01F *Pruno-Rubion radulae* Weber 1974

Bramble scrub on neutral and base-rich soils of Western and Central Europe

rha12 Rivas-Martínez et al. (2011: 337) prefer classifying this alliance within the *Sambucetalia racemosae (Robinietea)*. (LM)

- *Rubion subatlanticum* Tx. 1952 p.p. (34a)
- *Pruno spinosae-Rubion inermis* O. de Bolòs 1954 (in Julve 1993) (30, *mut.illeg.*)
- *Pruno-Rubion fruticosi* Tx. 1952 *corr*. Doing 1962 (phantom)
- *Pruno-Rubion subatlanticum* (Tx. 1952) Doing 1962 (29, 34a)
- *Carpino-Rubion* Doing 1963 (2b)
- *Euonymo-Crategion* Passarge et Hofmann 1968 (3d)
- *Pruno-Rubion sprengelii* Weber 1974 (syntax.syn.)
- *Pruno-Rubion macrophylli* Weber in Dierschke 1981 (18b)
- *Artemisio-Rubion lobatidentis* Passarge 1982 (syntax.syn.)
- *Lysimachio-Rubion nessensis* Passarge 1982 (syntax.syn.)
- *Lonicerion periclymeni* Géhu et al. 1983 (2b)

rha13 Bardat et al. (2004: 36) prefer to consider this unit as alliance in its own right. (LM)

- *Mespilo germanicae-Ilicion aquifolii* de Foucault et Julve in Julve 1993 (3b)
- *Mespilo germanicae-Ilicion aquifolii* de Foucault et Julve 2001 (2b)

RHA-01G *Frangulo alni-Pyrion cordatae* Herrera et al. 1991

Cantabro-Atlantic mesophilous thorny hedges and mantle on nutrient-poor acidic soils

- *Pyro cordatae-Ulicion europaei* de Foucault et Julve in Julve 1993 (3b)
- *Ulici europaei-Rubion ulmifolii* Weber 1997 (syntax.syn.)
- *Rubo ulmifolii-Ulicion europaei* de Foucault et Julve 2001 (5)

RHA-01H *Tamo communis-Viburnion lantanae* (Géhu et al. 1983) Mucina *stat. nov. hoc loco*

Franco-Atlantic mesophilous mantle scrub on basic and neutral soils

rha14 Original name and status (sub-alliance): *Tamo communis-Viburnenion lantanae* Géhu, de Foucault et Delelis 1983. This syntaxonomic concept was validly published by Géhu, de Foucault et Delelis (1983; the symposium was held in 1979) as a suballiance (*Tamo communis-Viburnenion lantanae* Géhu et al. 1983) and as such has been for instance accepted by Rivas-Martínez et al. 2011: 335). The *Tamo communis-Viburnetum lantanae* Géhu et al. ex Géhu, de Foucault et Delelis 1983 was designated as the *holotypus* of the suballiance. This unit deserves the status of an alliance as already suggested invalidly by J.-M. Géhu in Bardat et al. (2004: 36, 'all prov. et stat. prov.'; ICPN art. 3b). Here we perform the valid change of the status and list the following taxa as the character taxa of the new alliance: *Crataegus laevigata, Dioscorea communis, Rosa canina* and *Viburnum lantana*. The *Tamo communis-Viburnetum lantanae* Géhu et al. ex Géhu, de Foucault et Delelis 1983 (Géhu et al. 1983: 467) is the *holotypus (hoc loco)* of the alliance. (LM)

- *Rosion micranthae* Arlot 1985 (2d, 5)
- *Rubo ulmifolii-Viburnion lantanae* de Foucault et Julve 2001 (5)
- *Tamo communis-Salicion acuminatae* de Foucault et Julve 2001 (5)
- *Tamo communis-Viburnion lantanae* (Géhu et al. 1983) Géhu in Bardat et al. 2004 (3b)

RHA-01I *Brachypodio pinnati-Juniperion communis* Mucina *all. nov. hoc loco*

Low-altitude thermophilous juniper scrub on calcareous substrates of Western and Central Europe

rha15 Passarge (1978: 176) described this alliance invalidly as '*Carici-Juniperion* all. nov. prov.') and classified here only one association – the '*Koelerio-Juniperetum communis* (Kaiser 1926) Rausch. 1968'. He has failed, however, to refer either to Kaiser (1926) or to Rauschert (1968). ('Rauschert 1968' is in fact Rauschert 1969 – an unpublished thesis.) Therefore the alliance name in Passarge (1978) should be considered a *nomen nudum*. The '*Koelerio-Juniperetum communis*' of Passarge (l.c.) obviously refers to the Kaiser's (1926: 170, Tab. 202) 'Grasreiches Wacholdergebüsch, *Juniperus communis-Brachypodium pinnatum (Festuca ovina, Sesleria coerulea)*-A.' Choosing Kaiser's association as the *typus* of the '*Carici-Juniperion*' would not be appropriate since there is no *Carex* species occurring in the relevés of the Tab. 202. Therefore I choose to coin a new name for this alliance – the *Brachypodio pinnati-Juniperion communis*. *Juniperus communis, Brachypodium pinnatum, Koeleria macrantha* and *Fragaria viridis* are considered diagnostic species of the alliance. The *Koelerio-Juniperetum communis* Rauschert in Rauschert, Hilbig et Klotz 1990 (Rauschert et al. 1990: 232–233, Tab. 13) becomes the *holotypus (hoc loco)* of the alliance. (LM)

- *Carici-Juniperion communis* Passarge 1978 (2b, 3b, 3f)

GROUP OF EASTERN EUROPEAN ALLIANCES (FOREST-STEPPE AND STEPPE ZONES)

RHA-01J *Prunion fruticosae* Tx. 1952

Subcontinental and continental scrub in the forest-steppe and steppe zones of Central and Eastern Europe

- *Prunion spinoso-fruticosae* Zólyomi et Jakucs 1957 (2b)
- *Amygdalion nanae* Golub in Il'ina et al. 1991 (1)

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rha16 Yamalov & Mirkin (2010) classified this alliance within the *Helictotricho-Stipetalia*. (LM)
- *Amygdalion nanae* Golub 2011 (syntax.syn.)
- *Spiraeion mediae* Borhidi et Varga 1998 (phantom)
- *Spiraeion chamaedryfoliae* Sanda et Popescu in Sanda et al. 1999
- *Spiraeion mediae* Borhidi et Varga in Borhidi 1999 (2b, 5)
- *Spiraeion mediae* Borhidi et Varga ex Borhidi 2003 (syntax.syn.)

RHA-01K *Lamio purpureae-Acerion tatarici* Fitsailo 2007

Mesophilous scrub on chernozem soils in the forest-steppe zone of southwestern Ukraine and Moldova
- *Acerion tatarici* Fitsailo (2007) 2008 (29c)

GROUP OF WARM-TEMPERATE ORDERS

RHA-02 *Paliuretalia* Trinajstić 1978

Thermophilous mantle, pseudomaquis and šibljak fringing oak forests of the submediterranean regions of southeastern Europe
- *Cotinetalia coggygriae* Doing-Kraft 1955 (2b)
- *Cotino-Paliuretalia* P. Fukarek 1958 (phantom)
- *Quercetalia pubescentis submediterranea* Horvat 1959 (2b)
- *Cotino-Paliuretalia* P. Fukarek 1962 (3b)
- *Paliuro-Cotinetalia* Doing Kraft in P. Fukarek 1968 (2b)
- *Paliuretalia* Trinajstić 1977 (phantom)

GROUP OF CENTRAL SUBMEDITERRANEAN ALLIANCES

RHA-02A *Cytision sessilifolii* Biondi in Biondi et al. 1989

Submediterranean thermophilous broom scrub in the submontane and montane belts of the Central and Southern Apennines
- *Cytision sessilifolii* Biondi in Biondi et al. 1988 (phantom)
- *Teucrio chamaedrys-Cytisophyllon sessilifolii* Ubaldi 2011 (5)

RHA-02B *Ilici-Crataegion laciniatae* Ubaldi 2011

Supramediterranean relict orophilous scrub of Northern Sicily
- *Berberido aetnensis-Crataegion laciniatae* Gianguzzi et al. 2011 (syntax.syn.)

GROUP OF EASTERN SUBMEDITERRANEAN ALLIANCES

RHA-02C *Fraxino orni-Cotinion* Soó 1960

Thermophilous mantle vegetation of the Southern Pannonian oak forests
- *Orno-Colurnion* Borza 1958 (orig.form) (3b)
- *Cotinion* Soó 1960 (*sensu* Horvát 1977) (phantom)
- *Orno-Cotinion* Soó 1960 (orig.form)

RHA-02D *Buxo-Syringion* P. Fukarek ex Diklić 1965

Submediterranean thermophilous scrub of the continental Northern and Central Balkans
- *Cotino-Cotoneasterion* P. Fukarek 1958 (phantom)
- *Buxo-Syringion* P. Fukarek 1962 (2b)
- *Cotino-Cotoneasterion* P. Fukarek 1962 (3f)

rha17 The *Cotino-Cotoneasterion* is invalidly published name. Fukarek (1962) assigned the *Artemisio-Amygdaletum* Jovanović 1962 as the only association into the *Cotino-Cotoneasterion*, however the eponymous names of the new alliance (*Cotinus coggygria, Cotoneaster* sp.) were not explicitly listed in the original diagnosis of the alliance, nor one cannot find them in another part of the original diagnosis – the table of the *Artemisio-Amygdaletum* Jovanović 1962). (LM)
- *Pruno tenellae-Syringion* B. Jovanović 1979 (phantom)
- *Pruno tenellae-Syringion vulgaris* B. Jovanović in Jovanović et al 1986 (2b)
- *Pruno tenellae-Syringion* B. Jovanović ex Čarni et al. 2009 (5)

RHA-02E *Paliuro-Petterion* P. Fukarek 1962

Submediterranean thermophilous šibljak of the eastern Adriatic seaboards of the Balkan Peninsula
- *Paliuro-Petterion* P. Fukarek 1958 (phantom)
- *Paliurion adriaticum* Trinajstić 1977 (phantom)
- *Paliurion adriaticum* Trinajstić 1978 (34a)
- *Rhamno intermediae-Paliurion spinae-christi* Trinajstić (1978) 1996 (syntax.syn.)

RHA-02F *Rhamno saxatilis-Paliurion spinae-christi* Biondi, Casavecchia, Biscotti et Pesaresi in Biondi et al. 2014

Submediterranean thermophilous šibljak of the Apennine Peninsula

RHA-02G *Eryngio campestris-Paliurion spinae-christi* (Jovanović 1985) Matevski et al. 2008

Submediterranean thermophilous šibljak of the Central Balkans
- *Paliurion moesiacum* B. Jovanović 1985 (34a)
- *Asparago verticillati-Paliurion* Sanda et Popescu 1999
- *Paliurion aculeati* Redžić 2000

RHA-02H *Berberido creticae-Prunion cocomiliae* Bergmeier 1990

Submediterranean thermophilous scrub of the Hellenic Peninsula

RHA-02I *Asparago verticillati-Crataegion tauricae* Korzhenevskii et Kliukin 1990

Thermophilous submediterranean scrub on deep soils of Crimea

RHA-02J *Elytrigio nodosae-Rhuion coriariae* Korzhenevskii et Ryff ex Didukh et Mucina 2014

Submediterranean thermophilous scrub on eroding loamy schists of Crimea
- *Elytrigio nodosae-Rhoion coriariae* Korzhenevskii et Ryff 2002 (orig.form) (5)

RHA-03 *Pyro spinosae-Rubetalia ulmifolii* Biondi, Blasi et Casavecchia in Biondi et al. 2014

Spiny bramble scrub on nutrient-rich soils of the winter-mild Atlantic seaboards, the Mediterranean, the Macaronesian Archipelago and the Azores

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RHA-03A *Pruno spinosae-Rubion ulmifolii* O. de Bolòs 1954

Spiny bramble scrub of the winter-mild Atlantic seaboards and the Western Mediterranean

- *Pruno spinosae-Rubion inermis* O. de Bolòs 1954 *nom. mut. propos.* (*sensu* Julve 1993) (*mut.superfl.*)
- *Ligustro-Rubion ulmifolii* Géhu et Delelis in Delelis 1973 (3b)

RHA-03B *Arundo plinii-Rubion ulmifolii* Biondi, Blasi, Casavecchia et Gasparri in Biondi et al. 2014

Spiny bramble scrub of the Central and Eastern Mediterranean

RHA-03C *Rubio periclymeni-Rubion ulmifolii* Oberd. ex Rivas-Mart. et al. 1993

Spiny bramble thicket mantle of the laurisilva of Madeira and the Canary Islands

- *Rubion canariensis* Oberd. 1965 (34a)

RHA-03D *Scrophulario glabratae-Rubion ulmifolii* Vicente Orellana et al. 2012

Spiny lianoid thicket mantle of the laurisilva forests of the Azores

RHA-04 *Lauro nobilis-Sambucetalia nigrae* Biondi, Blasi, Casavecchia, Galdenzi et Gasparri in Biondi et al. 2014

Mesic scrub in shady habitats on nutrient-rich soils of the Central Mediterranean

RHA-04A *Lauro nobilis-Sambucion nigrae* Biondi, Blasi, Casavecchia, Galdenzi et Gasparri in Biondi et al. 2014

LON *Lonicero-Rubetea plicati* Haveman, Schaminée et Stortelder in Stortelder et al. 1993

Acidophilous scrub and hedges of forest edges and clearings on dry sandy nutrient-poor minerotrophic soils of Western Europe

- *Salici-Franguletea* Jurko 1964 p.p. (2b)
- *Betulo-Franguletea* Passarge 1968 (phantom)
- *Betulo-Franguletea* Passarge in Passarge et G. Hofmann 1968 (2b)
- *Lonicero-Rubetea plicati* Haveman, Schaminée et Stortelder in Haveman 1997 (2b)
- *Rubo plicati-Franguletea* Weber 1999 (phantom)

LON-01 *Rubetalia plicati* Weber in Pott 1995

Acidophilous scrub of forest clearings and hedges on dry sandy, nutrient-poor soils of the (sub)atlantic regions of northwestern Europe

lon01 KD prefers the classification of the *Rubetalia plicati* within the *Rhamno-Prunetea*. (LM) There are no character species supporting such step. (HW)

- *Pteridio-Rubetalia* Doing 1962 (2b)
- *Rubo-Franguletalia* Passarge 1968 (phantom)
- *Rubo-Franguletalia* Passarge in Passarge et G. Hofmann 1968 (3b)
- *Pteridio-Rubetalia* Doing ex Weber 1977 (3f)
- *Rubo-Franguletalia* Passarge 1978 (3b)
- *Pteridio-Rubetalia* Doing ex Birse 1984 (2b)

LON-01A *Lonicero-Rubion silvatici* Tx. et Neumann ex Wittig 1977

Acidophilous bramble scrub, hedges and scrub of forest clearings on dry sandy nutrient-poor minerotrophic soils of northwestern Europe

- *Lonicero-Rubion silvatici* Tx. et Neumann in Tx. 1950 (2b)
- *Rubion plicati* Weber 1977 (syntax.syn.)

lon02 This name was published in Oct. in the same year (Weber 1977) and the earlier Wittig's (February 1977) validation of the *Lonicero-Rubion silvatici* Tx. et Neumann ex Wittig 1977. (HW)

LON-01B *Molinio-Frangulion* Passarge in Passarge et G. Hofmann 1968

Acidophilous buckthorn scrub, hedges and scrub of forest clearings on dry sandy nutrient-poor minerotrophic soils of northwestern Europe

- *Molinio-Frangulion* Passarge 1968 (phantom)
- *Agrostio-Frangulion* Passarge 1968 (phantom)
- *Agrostio-Frangulion* Passarge in Passarge et G. Hofmann 1968 (syntax.syn.)

LON-02 *Frangulo-Prunetalia insititiae* Rivas Goday 1964

Acidophilous scrub of forest clearings and hedges on dry sandy nutrient-poor soils of the (sub)atlantic regions of southwestern Europe

lon03 We consider the publication of the name *Frangulo-Prunetalia insititiae* (Rivas Goday 1964: 563) as valid since it contains one validly described alliance – the *Frangulo-Rubion* Rivas Goday 1964. (LM)

- *Frangulo-Prunetalia insitiae* Rivas Goday 1961 (2b)

LON-02A *Frangulo-Rubion* Rivas Goday 1964

Acidophilous scrub of forest clearings and hedges on dry sandy nutrient-poor soils of the (sub)atlantic regions of southwestern Europe

lon04 The *Frangulo-Rubion* Rivas Goday 1964 is validly published (Rivas Goday 1964: 563). The original diagnosis of the alliance contains the 'associaciones … *Crataegus-Primula (vulgaris) acaulis* Br.-Bl. et Tx. 1952' (*recte*: *Primulo vulgaris-Crataegetum*) for which a reference to Braun-Blanquet & Tüxen (1952) is provided, along with a new subasssociation ('subas. con *Lonicera peryclimenum* L. ssp. *hispanica* (B. et R.), *Prunus insititia* L.' (*nom.illeg.*, ICPN art. 34c) documented by one relevé provided on the same page. (LM)

ROB *Robinietea* Jurko ex Hadač et Sofron 1980

Seral forest-clearing and anthropogenic successional scrub and thickets on nutrient-rich soils of temperate Europe

- *Robinietea* Jurko 1964 (2b)

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ROB-01 *Sambucetalia racemosae* Oberd. ex Doing 1962
Elder, willow and hazel scrub on nutrient-rich soils in forest clearings of temperate Europe
- *Rubo-Sambucetalia racemosae* Oberd. 1957 (phantom)
- *Sambucetalia racemosae* Oberd. 1957 (3b)
- *Sambucetalia racemosae* Oberd. ex Passarge in Scamoni 1963 (31)
- *Deschampsio-Betuletalia* Passarge et G. Hofmann 1968 (2b, 3b)
- *Athyrio-Rubetalia idaei* Passarge 1982 (syntax.syn.)
- *Atropo bellae-donnae-Rubetalia macrophylli* Gillet in Julve 1993 (5)
- *Crataego laevigatae-Sambucetalia nigrae* de Foucault et Julve in Julve 1993 (3b)
- *Sambuco nigrae-Salicetalia capreae* Rameau in Rameau et al. 1993 (2b, 3b)
- *Crataego laevigatae-Sambucetalia nigrae* de Foucault et Julve 2001 (5)

ROB-01A *Sambuco-Salicion capreae* Tx. et Neumann ex Oberd. 1957
Elder, willow and hazel scrub on nutrient-rich soils in forest clearings of temperate Europe
- *Sambuco-Salicion capreae* Tx. et Neumann in Tx. 1950 (2b)
- *Avenello-Betulion pendulae* Passarge 1978 (2b)
- *Athyrio-Rubion idaei* Passarge 1982 (5)

ROB-02 *Chelidonio-Robinietalia pseudoacaciae* Jurko ex Hadač et Sofron 1980
Subspontaneous anthropogenic scrub and low-grown forest groves
rob01 This is, in Europe, a purely anthropogenic unit comprising communities largely dominated by alien trees. Following the proposal of Jurko (1964) and later Hadač & Sofron (1980), this vegetation is classified as a class in its own right – the *Robinietea.* (LM)
- *Chelidonio-Robinietalia pseudoacaciae* Jurko 1963 (2b)
- *Urtico-Sambucetalia nigrae* Schubert et al. 2001 (phantom)
- *Galio aparines-Sambucetalia nigrae* Rameau 1996 (1)

ROB-02A *Aegopodio podagrariae-Sambucion nigrae* Chytrý 2013
Anthropogenic elder scrub in ruderal habitats of Western and Central Europe
- *Arctio-Sambucion nigrae* Doing 1962 (2b)
- *Arctio-Sambucion nigrae* Doing 1969 (phantom)

rob02 Willner & Grabherr (2007: 73) classified this alliance within the *Prunetalia* (*Rhamno-Prunetea*).(LM)
- *Balloto-Sambucion nigrae* (Jurko 1963) Passarge 1978 (2b)
- *Humulo lupuli-Sambucion nigrae* de Foucault et Julve in Julve 1993 (2d, 3b)
- *Galio aparines-Sambucion nigrae* Rameau 1996 (1)
- *Humulo lupuli-Sambucion nigrae* de Foucault et Julve 2001 (8)

ROB-02B *Balloto nigrae-Robinion pseudoacaciae* Hadač et Sofron 1980
Robinia groves with weedy understorey on loamy-sandy dry soils of Central and Eastern Europe
- *Robinion pseudoacaciae* Csűrös-Káptalan 1968 (phantom)
- *Robinion pseudoacaciae* Csűrös-Káptalan 1969 (2b)
- *Robinion pseudoacaciae* Smetana et al. 1997

ROB-02C *Chelidonio majoris-Robinion pseudoacaciae* Hadač et Sofron ex Vítková in Chytrý 2013
Robinia groves with weedy understorey on nutrient-rich mesic soils of Central and Eastern Europe
- *Chelidonio-Robinion pseudoacaciae* Hadač et Sofron 1980 (2b)
- *Robinio pseudoacaciae-Ulmion minoris* Julve 1993 (2b)

ROB-02D *Euphorbio cyparissiae-Robinion pseudoacaciae* Vítková in Kolbek et al. 2003
Robinia groves and scrub in dry and warm habitats on shallow soils of Central Europe

ROB-02E *Chelidonio-Acerion negundo* L. Ishbirdin et A. Ishbirdin 1989
Subspontaneous groves and scrub of Acer negundo of Eastern Europe
- *Ulmo carpinifoliae-Acerion negundo* Smetana et al. 1997
- *Ulmo laevis-Acerion negundo* Smetana et al. 1998

ARE *Salicetea arenariae* Weber 1999
Dune scrub of the Atlantic coasts of Western Europe
are01 This unit has a geographic analogon in the East Asia – the *Rosetea rugosae.* (LM)

ARE-01 *Salicetalia arenariae* Preising et Weber 1997
Dune scrub of the Atlantic coasts of Western Europe

ARE-01A *Salicion arenariae* Tx. ex Passarge in Scamoni 1963
Willow and sea buckthorn low scrub on dunes of the oceanic regions of Western Europe
- *Salicion arenariae* Tx. 1952 (2b)
- *Empetro-Salicion arenariae* Doing 1963 (2b)
- *Salicion aurito-arenariae* Boeuf et al. 2014 (syntax.syn.)

ARE-01B *Ligustro-Hippophaeion* Géhu et Géhu-Franck 1983
Elder, privet and sea buckthorn tall scrub on dunes of the oceanic regions of Western Europe
- *Oenothero-Hippophaeion maritimi* Doing 1962 (phantom)
- *Oenothero-Hippophaeion maritimi* Doing 1969 (2b)

ARE-01C *Holoschoeno australis-Salicion arenariae* Neto et al. 2004
Willow scrub on dunes of southwestern Iberian Peninsula

ARE-01D *Pyracantho coccineae-Hippophaeion fluviatilis* de Foucault et Julve 2001
Willow scrub on dunes of the coastal dunes along the Adriatic Sea

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- *Pyracantho coccineae-Hippophaeion rhamnoidis ssp. fluviatilis* de Foucault et Julve 2001 (orig.form)

INTRAZONAL BOREO-TEMPERATE GRASSLANDS AND HEATH

ULI *Calluno-Ulicetea* Br.-Bl. et Tx. ex Klika et Hadač 1944

Heath on acidic nutrient-poor soils in the lowland to montane belts of the temperate and boreal zones of Europe

- *Calluno-Ulicetea* Br.-Bl. et Tx. 1943 (2b)
- *Calluno-Ulicetea* Br.-Bl. et Tx. ex Westhoff et al. 1946 (31)
- *Querceto-Ulicetea* Br.-Bl. in Br.-Bl. et al. 1947 (orig.form) (2b)
- *Calluno-Ulicetea* Br.-Bl. et Tx. ex Klika 1948 (31)
- *Querco-Ulicetea* Lebrun et al. 1949 p.p. (31)
- *Calluno-Ulicetea* Br.-Bl. et Tx. ex Br.-Bl. et al. 1952 (31)
- *Vaccinio-Juniperetea communis* Passarge in Passarge et G. Hofmann 1968 (2b)

uli01 The name is invalidly published in Passarge & Hofmann (1968) because the original diagnosis contains no order (IPCN art. 2b) but only an alliance – the *Vaccinio-Juniperion communis*. In Passarge (1978) the name was published validly. Structurally these communities are close to heath and therefore, this class should be placed as a synonym of the *Calluno-Ulicetea*. (JPT)

- *Vaccinio-Juniperetea communis* Passarge in Passarge et G. Hofmann ex Passarge 1978 (syntax.syn.)
- *Vaccinio-Juniperetea communis* Passarge in Passarge et G. Hofmann ex Resmeriță 1978 (31)

uli02 The name '*Vaccinio-Juniperetea* Pass et Hoffm. 1968' was incidentally validly published in Resmeriță (1978). The diagnosis contains the unique order '*Vaccinio-Juniperetalia* Pass et Hoffm. 1968' the diagnosis of which contains three alliances that provide a sufficient diagnosis, among those the '*Vaccinio-Juniperion* Pass. et Hofm. 1968' with an unambiguous bibliographical reference to Passarge & Hofmann (1968). According to ICPN art. 20, the *Vaccinio-Juniperion* is automatically the type of the name '*Vaccinio-Juniperetalia* Passarge et Hoffmann ex Resmeriță 1978'. Consequently, the names '*Vaccinio-Juniperetea* Passarge et Hoffmann ex Resmeriță 1978' and '*Vaccinio-Juniperetea communis* Passarge 1978' are nomenclatural synonyms. The paper of Passarge (1978) was published in June 1978 while the paper by Resmeriță was published in November 1978 – hence the former has the priority. (JPT)

ULI-01 *Ulicetalia nani* Quantin 1935

Gorse and ericoid heath of the winter-mild temperate regions of Western Europe, the Western Mediterranean and Northern Morocco

- *Ulicetalia minoris* Quantin 1935 *nom. mut. propos.* (45)
- *Calluno-Ulicetalia minoris* (Quantin1935) Tx. 1937 (29)
- *Calluno-Genistetalia* Schwickerath 1944 p.p. (2b)
- *(Calluno-)Ulicetalia* Oberd. 1949 (orig.form) (2b)
- *Ulicetalia* Rothmaler 1954 (2b)
- *Ulicetalia europaeae* Schubert 1960
- *Genisto-Callunetalia* Doing 1963 (2b)
- *Ulici (nanae)-Ericetalia cinereae* Doing 1963 (2b)
- *Erico-Ulicetalia* Br.-Bl. et al. 1964 (syntax.syn.)
- *Erico-Genistetalia* Br.-Bl. 1967 (29)

ATLANTIC GROUP OF ALLIANCES

ULI-01A *Ericion cinereae* Böcher 1940

Bell-heather heaths of the oceanic regions of Western Europe

- *Ulici-Ericion cinereae* Géhu 1973 (2b)
- *Ulici-Ericion cinereae* Géhu 1975 (syntax.syn.)

ULI-01B *Ulicion* Malcuit 1929

Gorse heath of the oceanic regions of Western Europe

- *Ulicion* Luquet 1926 (2b)
- *Ulicion minoris* Malcuit 1929 *nom. mut. propos.* (45)
- *Ulicion* Quantin 1935 (31)
- *Erico-Ulicion* Lemée 1938
- *Ulicion nanae euatlanticum* Duvigneaud 1944 (orig.form) (34a)
- *Ulicion gallii* Des Abbayes et Corillion 1949
- *Ulicion gallii* Géhu 1963 (syntax.syn.)
- *Ulicion nanae-gallii* Bridgewater 1971
- *Ulici-Ericion ciliaris* Géhu 1975 (syntax.syn.)
- *Dactylido maritimae-Ulicion maritimi* Géhu 1975 (2b)
- *Dactylido oceanicae-Ulicion maritimi* Géhu 1975 *nom. mut. propos.* (2b, *mut.illeg.*)

uli03 Syntaxonomically, the invalid *Dactylido-Ulicion maritimi* can be included in the *Ulicion* (see for instance as done by Rivas-Martínez (1979: 18). The name *Dactylido maritimae-Ulicion maritimi* J.-M. Géhu 1975, being invalidly published, has no need for correction. (JPT)

- *Ulicion maritimi* Géhu et Franck 1985 (2b)

ULI-01C *Daboecion cantabricae* (Dupont ex Rivas-Mart. 1979) Rivas-Mart. et al. in Loidi et al. 1997

Hiberno-Cantabrian and French-Biscayan humid-superhumid ericoid heath over acid ferric-humic podsols

- *Daboecion cantabricae* Dupont 1975 (2b)
- *Daboecion cantabricae* (Dupont ex Rivas-Mart. 1979) Rivas-Mart. et al. 1999 (31)

uli04 The rank-change of the (suballiance) *Daboecenion cantabricae* to the alliance level was performed earlier by Loidi Arregui et al. (1997). (JPT)

ULI-01D *Ericion umbellatae* Br.-Bl. in Br.-Bl. et al. 1952

Thermo-supramediterranean subhumid low silicicolous heath of the north-central and eastern regions of the Iberian Peninsula and Provence

- *Pterospartion* Rothmaler 1943 (2b)

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• *Halimio-Ulicion* Rothmaler 1954 (syntax.syn.)

uli05 Rothmaler (1954: 599) validly published the name *Halimio-Ulicion*. The original diagnosis of the alliance contains three associations of which two were validly published (Rothmaler 1954: synoptic Table 1), namely the *Pterospartio-Ericetum aragonensis* Rothmaler 1954 *nom. illeg.* (ICPN art. 34) and the *Pterospartio-Ericetum cinereae* Rothmaler 1954. Both associations contain two species of the genus *Halimium* (*H. alyssoides* and *H. umbellatum*). The third element of the alliance, the *Pterospartio-Ericetum gallaecicum* Rothmaler 1954, was published invalidly because the synoptic table is missing the species of frequency below the constancy degree IV (ICPN art. 7). (JPT)

• *Ericion aragonensis* Rivas-Mart. 1962 (2b)
• *Genisto-Ericion aragonensis* Rivas-Mart. 1962 (2b)
• *Cistion hirsuti* Br.-Bl. et al. 1964 (29a)
• *Ericion australis* Bellot et Casaseca in Bellot 1968
• *Cisto salviifolii-Ericion cinereae* Géhu in Bardat et al. 2004 (2b)

MEDITERRANEAN GROUP OF ALLIANCES

ULI-01E *Genistion micrantho-anglicae* Rivas-Mart. 1979

Iberoatlantic and orocantabro-atlantic hygrophilous silicicolous heath on clayey humus-rich soils

ULI-01F *Stauracanthion boivinii* (Rivas-Mart. 1979) Rivas-Mart. et al. 1999

Southern Iberian and Northern Moroccan thermo-mesomediterranean subhumid to perhumid silicicolous brezal

• *Nepion boivinii* (Rivas-Mart. 1979) Rivas-Mart. et al. 1999 *nom. mut. propos.* (45)

uli06 The proposal to mutate the name was published by Rivas-Martínez et al. (2011: 310). (LM)

• *Ulici lusitanici-Genistion ancistrocarpae* Neto et al. 2014 (2b, 5)

AZOREAN ALLIANCE

ULI-01G *Daboecion azoricae* Lüpnitz 1975

High-altitude hyperhumid heath of the Azores

ULI-02 *Vaccinio myrtilli-Genistetalia pilosae* Schubert ex Passarge 1964

Heath of cold-atlantic, subcontinental and subboreal and boreal regions of Western, Central and northeastern Europe and Scandinavia

• *Calluno-Genistetalia* P. Duvigneaud 1944 (phantom)
• *Calluno-Genistetalia* Schwickerath 1944 p.p. (2b)
• *Vaccinio-Genistetalia* Schubert 1960 (2b)
• *Callunetalia vulgaris* Borza 1963 (phantom)
• *Callunetalia vulgaris* Borza et Boşcaiu 1965 (2b)
• *Callunetalia vulgaris* Pop et al. 1969 (syntax.syn.)

LOW-ALTITUDE GROUP OF ALLIANCES

ULI-02A *Empetrion nigri* Schubert ex Westhoff et Den Held 1969

Dune heath of the oceanic regions of Western Europe and Southern Scandinavia

• *Empetrion boreale* Böcher 1943 (2b)
• *Empetrion nigri* Schubert 1960 (2b)

ULI-02B *Calluno-Genistion pilosae* P. Duvigneaud 1945

Low-altitude heath of the atlantic and subcontinental regions of temperate Europe

• *Ulicion* Malcuit ex Tüxen 1937 (3f)
• *Genistion pilosae* P. Duvigneaud 1942 (*sensu* Schubert 1960; Schubert et al. 2001) (phantom)
• *Genisto-Callunion* Böcher 1943 (phantom)
• *Genistion pilosae* Böcher 1943 (2b)
• *Myrtillion boreale* Böcher 1943 (orig.form) (2b)
• *Myrtillion* (Böcher 1943) Bridgewater ex Shimwell 1975 (orig.form) (2b)
• *Callunion balticum* Böcher 1943 (2b)
• *Genisto-Callunion* Böcher 1943 (phantom)
• *Vaccinio-Genistion pilosae* P. Duvigneaud 1943 (phantom)
• *Vaccinion vitis-idaeae* Böcher 1943 (phantom)
• *Calluno-Genistion pilosae* P. Duvigneaud 1944 (*sensu* Schubert 2001) (phantom)
• *Calluno-Genistion pilosae subatlanticum* P. Duvigneaud 1944 (34a)
• *Calluno-Arctostaphylion uvae-ursi* Tx. et Preising in Preising 1949 (1)
• *Vaccinion boreale* (Böcher 1943) Preising 1949 (1)
• *Vaccinion vitis-idaeae* Böcher ex Preising 1949 (1)
• *Calluno-Genistion pilosae* (Tüxen 1937) Preising 1953 (phantom)
• *Vaccinion vitis-idaeae* Schubert 1960 (2b)
• *Pohlio-Callunion* Shimwell 1973 (orig.form) (as suballiance) (2b)
• *Vaccinio-Callunion* Moore in Mhic Daeid 1976 (1)
• *Pohlio-Callunion* Brzeg 1982 (2b)
• *Genistion tinctorio-germanicae* (Böcher 1943) de Foucault 1991 (29)
• *Vaccinion vitis-idaeae* Schubert in Schubert et al. 1995 (5)

ULI-02C *Euphorbio-Callunion* Schubert ex Passarge 1964

Low-altitude heath of the continental regions of temperate Europe

• *Euphorbio-Callunion* Schubert 1960 (2b)
• *Callunion vulgaris* Borza 1963 (phantom)
• *Cladonio-Callunion* Passarge 1964 (3b)
• *Callunion vulgaris* Borza et Boşcaiu 1965 (2b)
• *Callunion vulgaris* Pop et al. 1969 (syntax.syn.)

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HIGH-ALTITUDE GROUP OF ALLIANCES

ULI-02D *Genisto pilosae-Vaccinion* Br.-Bl. 1926

Montane-subalpine dwarf heath on siliceous substrates of the nemoral mountain ranges of Western and Central Europe

- *Genisto-Vaccinion* Luquet 1926 (syntax.syn.)
- *Genisto-Vaccinion vitis-ideae* Br.-Bl. 1926 (Rec.10A, 40)
- *Genisto pilosae-Vaccinion* Br.-Bl. ex Schaminée 1993 (phantom)

ULI-02E *Bruckenthalion spiculifoliae* Horvat 1949

Supramontane and subalpine dwarf heath on siliceous substrates of the Southern Carpathians and the Dinarides

- *Junipero-Bruckenthalion spiculifoliae* (Horvat 1949) Boşcaiu 1971 (29)

ULI-03 *Vaccinio-Juniperetalia communis* Passarge 1972

Low-altitude acidophilous juniper scrub of temperate subatlantic regions of Europe

- *Pteridio-Juniperetalia communis* Lakušić 1978

ULI-03A *Vaccinio-Juniperion communis* Passarge in Passarge et G. Hofmann 1968

Low-altitude acidophilous juniper scrub of temperate subatlantic regions of Europe

- *Vaccinio-Juniperion communis* Passarge 1968 (phantom)
- *Juniperion communis* Fukarek 1969

NAR *Nardetea strictae* Rivas Goday et Borja Carbonell in Rivas Goday et Mayor López 1966 *nom. conserv. propos.*

Secondary mat-grass swards on nutrient-poor soils at low and mid-altitudes of the temperate, boreal and subarctic regions of Europe

nar01 De Foucault (1994, 2012) presented synoptic tables featuring the *Nardetalia* alongside the '*Festucetalia spadiceae*', *Saginetalia piliferi*, *Trifolietalia parnassi* and *Udo-Nardetalia* to be classified within the '*Nardetea*'. This classification has been also followed in some other European surveys (e.g. Kliment & Valachovič 2007). The synoptic tables in de Foucault's paper actually support the opposite view – one that has been adopted in our paper. We prefer to place the secondary oligotrophic pastures of the *Nardetalia* (the nomenclature type of the *Nardetea*) into the *Nardetea* as defined originally by Rivas Goday & Rivas-Martínez (1963), while the primary oligotrophic pastures/grasslands occurring at high altitudes and showing high level of regional and local endemism are classified within the *Juncetea trifidi*. The secondary low-altitude *Nardetalia* pastures are replacing various woods on nutrient-poor substrates (e.g. *Quercetea robori-petraeae*), degraded heaths of the *Calluno-Ulicetea* and drained oligotrophic wetlands. It is obvious that the historical and evolutionary (hence biogeographic) drivers in the secondary and primary oligotrophic grasslands are of different nature, steering the community assemblage in different ways. Mechanistic placement of the above-mentioned oligotrophic grassland units all under one broad umbrella on the basis of occurrence of a very broadly distributed group of species into the broadly conceived class '*Nardetea*' (as interpreted by de Foucault (l.c.) defies the logic of an informative syntaxonomic system. Some vegetation surveys prefer a physiognomically heterogeneous concept of a broader class – the *Calluno-Ulicetea sensu lato* (incl. both heath and oligotrophic grasslands) arguing for poor floristic difference between the *Nardetea* and the *Calluno-Ulicetea s.str.*, yet neglecting vegetation-structural characteristics. (LM) For the detailed argumentation underpinning the proposal to conserve the name *Nardetea strictae* Rivas Goday et Borja Carbonell in Rivas Goday et Mayor López 1966 against the name *Nardo-Callunetea* Preising 1950 see Di Pietro et al. (2015). (JPT)

- *Nardetea strictae* Oberd. 1949 (phantom)
- *Nardo-Callunetea* Preising 1949 (1)

nar02 The name '*Nardo-Callunetea*' was not validly published in Preising (1949) because the first volume of the 'Mitteilungen der Floristisch-Soziologischen Arbeitsgemeinschaft N.F.' was clearly not a printed matter and hence the diagnosis does not meet the conditions of the ICPN (art. 1). (JPT)

- *Nardo-Callunetea* Preising 1950 (syntax.syn.)

nar03 The valid publication of the name *Nardo-Callunetea* occurred in Preising (1950), where the original diagnosis of the *Calluno-Nardetea* contains only the *Nardetalia strictae*. Hence, the Preising's name would have the priority over the *Nardetea strictae* (however see Remark *nar01*). (JPT)

- *Nardetea strictae* Rivas Goday et Borja Carbonell 1961 (2b)
- *Nardetea strictae* Rivas Goday in Rivas Goday et Rivas-Mart. 1963 (2b)

NAR-01 *Nardetalia strictae* Preising 1950

Secondary mat-grass swards on nutrient-poor soils at low and mid-altitudes of temperate, boreal and subarctic regions of Europe

- *Nardetalia* Oberd. 1949 (2b, 3b)
- *Nardetalia* Oberd. ex Preising 1949 (1)
- *Agrostio-Festucetalia rubrae* Puşcaru et al. 1956 (syntax.syn.)
- *Juncetalia squarrosi* Passarge 1964 (syntax.syn.)
- *Nardetalia* Preising ex Rivas Goday et Mayor López 1966 (31)
- *Nardetalia boreo-alpinae* Barbero et Loisel 1969 (34a)
- *Cirsietalia vallis-demonis* S. Brullo et Grillo 1978 (syntax.syn.)

nar04 The authors of the protologue (Brullo & Grillo 1978) classified this endemic vegetation type within the *Molinio-Arrhenatheretea*. (LM)

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- *Nardetalia* Ladero et al. 1987 (2b)
- *Agrostio-Festucetalia rubrae* Solomakha 1996 (2b)
- *Festuco-Agrostietalia* Redžić et al. 2013 (2b, 5)

BOREO-TEMPERATE GROUP OF ALLIANCES

NAR-01A *Equiseto-Galion borealis* Tx. in Tx. et Böttcher 1969

Slightly chionophilous grasslands on volcanic soils of Iceland

NAR-01B *Violion caninae* Schwickerath 1944

Meso-subxerophytic oligotrophic pastures in the lowland to submontane belts of Western and Central Europe

- *Violion caninae* Schwickerath 1941 (phantom)
- *Nardo-Galion saxatilis* Preising 1949 (1)
- *(Violio-)Nardion* Oberd. 1949 (orig.form) (2b, 3b)
- *Nardo-Galion saxatilis* Preising 1950 (syntax.syn.)
- *Violo caninae-Nardion* (Schwickerath 1944) Ellenberg 1978 (29)
- *Potentillo erectae-Holcion mollis* Passarge 1979 (syntax. syn.)
- *Agrostion curtisii* de Foucault 1986 (syntax.syn.)
- *Avenulo marginatae sulcatae-Nardion* Stieperaere 1990 (orig.form) (1)
- *Avenulo marginatae sulcatae-Nardion* Stieperaere in de Foucault 1994 (orig.form) (3b)
- *Danthonio decumbentis-Serapiadion linguae* de Foucault 1994 (syntax.syn.)
- *Galio saxatilis-Festucion filiformis* de Foucault 1994 (syntax.syn.)
- *Galio saxatilis-Festucion vivipareae* de Foucault 1994 (syntax.syn.)
- *Avenulo marginatae sulcatae-Nardion* Stieperaere in de Foucault 2012 (orig.form) (syntax.syn.)

NAR-01C *Nardo-Juncion squarrosi* (Oberd. 1957) Passarge 1964

Hygrophilous oligotrophic meadows on peaty soils of the subatlantic regions of Western and Central Europe

- *Juncion squarrosi* Oberd. 1956 (2b)
- *Molinio-Potentillion erecti* Doing 1963 (2b, 3b)
- *Juncion squarrosi* Oberd. 1978 (29)

NAR-01D *Nardo-Agrostion tenuis* Sillinger 1933

Mat-grass dry pastures in the submontane to subalpine belts of the mountain ranges of Central Europe and the Northern Balkans

- *Nardion strictae montanum* Domin 1933 (34a)
- *Agrostio-Festucion rubrae montanum* Puşcaru et al. 1956 (34a)
- *Agrostio-Festucion rubrae subalpinum* Puşcaru et al. 1956 (34a)
- *Festucion rubrae* Csűrös et al. 1958 (2b)
- *Agrostio-Festucion rubrae* (Puşcaru et al. 1956) Resmeriță 1978 (syntax.syn.)
- *Danthonio decumbentis-Nardion strictae* (Domin 1933) Redžić 2007 (29a)

SOUTH EUROPEAN GROUP OF ALLIANCES

NAR-01E *Campanulo-Nardion* Rivas-Mart. 1964

Oligotrophic mat-grass swards in the supramediterranean belt of the submediterranean regions of the Iberian Peninsula

- *Galio idubidae-Nardion strictae* (Rivas Goday et Rivas-Mart. 1963) de Foucault 1994 (3b)

NAR-01F *Nardo-Agrostion caninae* Cortini-Pedrotti et al. 1973

Oligotrophic mat-grass and tussock pastures in the montane belt of the Northern and Central Apennines

- *Violo pseudogracilis-Bromopsion caprinae* Terzi 2011 (syntax.syn.)

NAR-01G *Cirsio vallis-demoni-Nardion* Giacomini et Gentile ex Di Pietro et Theurillat in Di Pietro et al. 2015

Siculo-Calabrian supramediterranean mesic seasonal perennial pastures on siliceous substrates

- *Cirsio vallis-demoni-Nardion* Giacomini et Gentile 1961 (2b)
- *Cirsio vallis-demoni-Nardion* Giacomini et Gentile 1966 (31)
- *Potentillion calabrae* de Foucault 1994 (29c)

NAR-01H *Achilleo-Arnicion* Horvat et Pawłowski in Horvat 1960

Oligotrophic pastures in the lowland to submontane belts of the Western Balkans

- *Achilleo-Arnicion* Horvat 1930 (phantom)
- *Calluno-Festucion capillatae* Horvat 1959 (phantom)
- *Calluno-Festucion capillatae* Horvat 1962 (3b)
- *Achilleo-Arnicion* Horvat et Pawłowski ex Horvat et al. 1974 (31)
- *Calluno-Festucion capillatae* Horvat ex Horvat et al. 1974 (syntax.syn.)
- *Festuco-Agrostion capillaris* Redžić 1990 (1)

NAR-01I *Potentillo montenegrinae-Festucion paniculatae* Redžić ex Čarni et Mucina 2015

Subalpine tussock grasslands on decalcified deep calcareous soils of the Central Balkans

- *Festucion spadiceae* Redžić et al. 1984 (2b)
- *Carici-Festucion paniculatae calcicolum* Redžić 2003 (2b)
- *Potentillo montenegrinae-Festucion paniculatae* Redžić (2003) 2011 (2b, 5)

COR *Koelerio-Corynephoretea canescentis* Klika in Klika et Novák 1941

Dry grasslands on sandy soils and on rocky outcrops of the temperate to boreal zones of Europe, the North Atlantic islands and Greenland

cor01 Until about 1992–1993 the syntaxonomy of this class has not experienced any major changes since its first description by Klika (1941). In 1993 Mucina &

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Kolbek (1993b) united the *Koelerio-Corynephoretea* and the *Sedo-Scleranthetea* (Braun-Blanquet 1955). The syntaxonomic issues pertinent to this group of communities were reviewed in Dierschke (1986). Later (Dengler 2003), the concept of the *Koelerio-Corynephoretea* was further expanded by the addition of the syntaxonomic contents known as the '*Festucetalia vaginatae*' and the '*Artemisio-Koelerietalia*' (I prefer the latter to be classified within the *Helichryso-Crucianelletea maritimae*). Here I wish to revoke the original 1993 decision to lump the *Koelerio-Corynephoretea* and the *Sedo-Scleranthetea* and recognize the floristic and ecological differences between the xerophilous (prevalently grass-dominated) vegetation on sandy soils (*Koelerio-Corynephoretea*) from those on raw, skeletal soils of hard substrates rich in succulent (*Sedo-Scleranthetea*) at the class level. Unlike in 1993, I also place the *Festucetea vaginatae* in the *Koelerio-Corynephoretea*. (LM) JD claims that his widely conceived *Koelerio-Corynephoretea s.l.* (incl. the *Sedo-Scleranthetea* and *Festucetea vaginatae*) is supported by an extensive numerical analysis of 267 synoptic tables of the relevant vegetation types throughout Europe (Dengler 2003). This author further admits that there are two floristically and ecologically well-defined groups – a group of orders on deep sands (sometimes treated as the *Koelerio-Corynephorenea*) and a group of orders on shallow skeletal soils (sometimes treated as the *Sedo-Scleranthenea*). JD further suggests that the delimitation of the *Koelerio-Corynephoretea* towards several Mediterranean classes remains rather unclear and needs a large-scale revision. This particularly concerns the present concepts of the *Helianthemetea guttati*, the *Helichryso-Crucianelletea maritimae* and the *Festucetea indigestae*.

- *Koelerio-Corynephoretales* Klika in Klika et Novák 1941 (orig.form) (11)
- *Corynephoretea canescentis* Br.-Bl. et Tx. 1943 (2b)
- *Brometo-Corynephoretea* Segal et Westhoff in Westhoff et al. 1946 (orig.form) (syntax.syn.)
- *Festucetea ovinae* Knapp ex Westhoff et al. 1946 p.p. (2b)
- *Corynephoretea* Lebrun et al. 1949 (syntax.syn.)
- *Corynephoretea* Oberd. 1949 (2b)
- *Corynephoretea canescentis* Tx. 1955 (2b)
- *Corynephoretea canescentis* Br.-Bl. et Tx. ex Tx. et Oberd. 1958 (2b)
- *Caricetea arenariae* Doing 1963 (2b)
- *Tuberario guttatae-Corynephoretea* Hohenester 1967 (syntax.syn.)
- *Festucetea vaginatae* Soó 1968 (2b)

cor02 Although Soó (1968: F7) briefly elucidated why he described a new class, listed the diagnostic species (on page 20) and assigned order (*Festucetalia vaginatae*, with one alliance – the *Festucion vaginatae*) into his new class, the description remains invalid because he failed to make unequivocal citation or reference to the validly described association within the *Festucion vaginatae*, rendering both the *Festucion vaginatae* and hence the *Festucetalia vaginatae* invalid. (LM)

- *Festucetea vaginatae* Soó ex Vicherek 1972 (syntax.syn.)

cor03 The syntaxonomic content of this unit has been by some authors considered at the level of class (Soó 1968; Vicherek 1972; Chytrý 2007; Jarolímek & Šibík 2008; Sanda et al. 2008; Solomakha 2008) or as an order of the *Festuco-Brometea* (Mucina 1997; Solomeshch et al. 1997). Important arguments against the former solution were presented by Dengler (2003) and Kuzemko (2009). The latter solution has never been rigorously tested. (LM)

COR-01 *Corynephoretalia canescentis* Klika 1934

Silicicolous tussock grasslands on inland sand dunes of the atlantic and subatlantic regions of Western, Central and Eastern Europe

- *Festuco-Sedetalia acris* Tx. 1951 (syntax.syn.)
- *Sedo acris-Festucetalia* Tx. 1951 *nom. invers. propos.* (42)

cor04 Proposal to invert the name has been published by Dengler (2003: 204). (LM)

- *Koelerietalia* Oberd. 1957 (phantom)
- *Koelerietalia* Krausch 1962 (2b, 3b)
- *Festucetalia tenuifoliae* Doing 1963 (2b)
- *Koelerietalia* Doing 1963 (2b)

COR-01A *Corynephorion canescentis* Klika 1931

Silicicolous tussock open grasslands of the Atlantic and subatlantic regions of Western and Central Europe

- *Corynephorion* Br.-Bl. et De Leeuw 1926 (31)

cor05 Braun-Blanquet & De Leeuw (1936: 368) described the *Corynephorion* validly by assigning the validly described '*Festuca capillata-Galium maritimum* Ass.' to this alliance, This association became then automatically the *holotypus* of the *Corynephorion* Br.-Bl. et de Leeuw 1936, which is, a later homonym of the *Corynephorion canescentis* Klika 1931. (LM)

- *Filagini-Corynephorion* Passarge 1960
- *Spergulo-Corynephorion* (Klika 1931) Passarge 1960 (29)
- *Dicrano-Cladinion* Doing 1963
- *Caricion arenariae* Doing 1974
- *Polytricho-Cornicularion* Doing 1974
- *Sedo micranthi-Corynephorion canescentis* Loiseau et Felzines 2004 (2b)
- *Miboro minimae-Corynephorion canescentis* Loiseau et Felzines 2007 (syntax.syn)
- *Sedo micranthi-Corynephorion canescentis* Loiseau et Felzines 2007 (syntax.syn)

COR-01B *Koelerion glaucae* Volk 1931

Steppic grasslands on stabilized inland sand dunes on fluvioglacial deposits of Central Europe and the western regions of Eastern Europe

- *Helichrysion arenarii* Tx. 1951 (syntax.syn.)

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COR-01C *Sedo-Cerastion arvensis* Sissingh et Tideman 1960

Meso-xerophytic closed swards on acidic to neutral sandy soils in lowlands of the (sub)atlantic regions of Europe

cor06 While Weeda et al. (1996) restricted the concept of this syntaxon to the vegetation on river dunes of Western Europe, KD suggests widening the concept and considers this alliance as an atlantic to subatlantic analogue of the *Armerion elongatae*, where the matrix species *Festuca brevipila* is replaced by *F. filiformis*. (LM)

- *Hieracio-Festucion tenuifoliae* Doing 1963 (2b)
- *Sedo-Koelerion gracilis* Doing 1963 (2b)
- *Pilosello-Festucion tenuifoliae* Doing 1974 (orig.form) (2b)
- *Carici arenariae-Festucion filiformis* de Foucault 1993 (phantom)
- *Carici arenariae-Festucion filiformis* de Foucault 1994 (syntax.syn.)
- *Polygalo vulgaris-Koelerion macranthae* Weeda, Doing et Schaminée 1996 (5)
- *Festucion guestfalico-filiformis* Loiseau et Felzines in Royer et al. 2006 (2b, 3b, 5)

COR-01D *Armerion elongatae* Pötsch 1962

Meso-xerophytic closed swards on slightly acidic to alkaline sandy soils in the lowlands of subcontinental Europe

- *Armerion elongatae* Krausch 1959 (1)
- *Armerion elongatae* Krausch 1962 (2b)
- *Plantagini lanceolatae-Festucion ovinae* Passarge 1964 (syntax.syn.)
- *Plantagini lanceolatae-Festucion brevipilae* Passarge 1964 *corr*. Dierssen 1996 (43)
- *Vicio lathyroidis-Potentillion argenteae* Brzeg in Brzeg et Wojterska 1996 (syntax.syn.)
- *Plantagini lanceolatae-Festucion brevipilae* Passarge 1964 *corr*. Kratzert et Dengler 1999 (*corr.superfl.*)

COR-02 *Festucetalia vaginatae* Soó 1957

European (sub)continental fescue sandy steppes in the forest-steppe and steppe zones of Europe

- *Festucetalia vaginatae* Soó 1968 (2b)
- *Festuco-Astragaletalia arenarii* Vicherek 1972 (syntax.syn.)

COR-02A *Festucion vaginatae* de Soó 1929

Pannonian subcontinental fescue sandy steppes

- *Festucion vaginatae* Soó 1938 (31)
- *Festucion vaginatae* Soó von Bere 1940 (2b)
- *Festucion vaginatae basiphilum et neutrophilum* Šmarda 1953 (34a)
- *Festucion vaginatae* Soó 1968 (31)
- *Eu-Festucion vaginatae* Soó 1980 (2b)

COR-02B *Festucion beckeri* Vicherek 1972

Pontic continental fescue sandy steppes

cor07 Dengler (2003: 202 et seq. and unpubl.) considers the *Festucion beckeri* to be a Pontic analogon of the northwestern Sarmatian *Koelerion glaucae* and the Pannonian *Festucion vaginatae*, with which it shares ecological and physiognomic features as well as many species. The matrix-forming fescues (*F. psammophila, F. polesica* in the *Koelerion glaucae*, *F. vaginata* in the *Festucion vaginatae* and *F. beckeri* in the *Festucion beckeri* are also very closely related). By contrast, the stands of the *Festucion beckeri* on sand dunes in Southern Ukraine hardly share any species with typical steppes of the *Festuco-Brometea* on loess sites nearby. (JD)

SED *Sedo-Scleranthetea* Br.-Bl. 1955

Pioneer vegetation on shallow soils on rocky siliceous outcrops on siliceous rocks of temperate and boreal Europe

sed01 This syntaxon has been in use in many national vegetation surveys (Oberdorfer et al. 1967; Oberdorfer 1992; Valachovič et al. 1995; Jarolímek & Šibík 2008) and lately also by Rivas-Martínez et al. (2011). (LM)

- *Bryo-Thero-Graminetea* Pignatti 1953 (34c)
- *Festuco-Sedetea* Oberd. 1957 (3b)
- *Xerobrometo-Sedetea* Doing 1963 (orig.form) (2b)
- *Sedo albi* subsp. *albi-Scleranthetea perennis* subsp. *perennis* Br.-Bl. 1955 *emend.* de Foucault 1999 (orig.form) (40)

SED-01 *Sedo-Poetalia glaucae* de Molenaar 1976

Open subthermophilous grasslands on skeletal shallow soils of Scandinavia and Greenland

SED-01A *Veronico-Poion glaucae* Nordhagen 1943

Open subthermophilous grasslands on sandy and skeletal shallow soils on neutral-basic substrates of Scandinavia

- *Veronico-Poion glaucae* Nordhagen 1942 (phantom)
- *Veronico-Poion alpinae* Sunding 1978 (2b)

SED-01B *Rumici acetosellae-Agrostion borealis* Knapp 1964

Open subthermophilous grassy swards and low scrub on skeletal shallow soils on siliceous substrates of Greenland

- *Sedo-Thymion* De Molenaar 1976 (syntax.syn.)

SED-02 *Sedo-Scleranthetalia* Br.-Bl. 1955

Pioneer herb-rich vegetation on shallow soils on rocky outcrops in the nemoral and boreal zones of Europe

- *Sempervivo-Sedetalia* (Br.-Bl. 1955) T. Müller 1961 (29a)
- *Trifolio arvensis-Festucetalia ovinae* Moravec 1967 (syntax.syn.)
- *Agrostio capillaris-Jasionetalia montanae* de Foucault 1999 (phantom)
- *Sedetalia micranthi* de Foucault 1999 (phantom)
- *Sileno rupestris-Sempervivetalia montani* de Foucault 1999 (phantom)
- *Agrostio capillaris-Jasionetalia montanae* de Foucault 2001 (5)
- *Sileno rupestris-Sempervivetalia montani* de Foucault 2001 (2b)

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SED-02A *Sedo albi-Veronicion dillenii* Korneck 1974

Thermophilous therophyte- and geophyte-rich vegetation on stable siliceous rubble of Central Europe and Ukraine

- *Veronicion* Oberd. 1957 (3b)
- *Rumici-Veronicion dillenii* Passarge 1977 (syntax.syn.)
- *Spergulo pentandrae-Veronicion dillenii* de Foucault 1999 (phantom)
- *Trifolio arvensis-Sedion* Shevchyk et Polishko 2000 (syntax.syn.)
- *Spergulo pentandrae-Veronicion dillenii* de Foucault 2001 (2b)

SED-02B *Sedo-Scleranthion* Br.-Bl. et Richard 1950

Pioneer vegetation on acidic shallow soils on siliceous rocky outcrops of the valleys of the Alps

- *Sedo-Scleranthion* Br.-Bl. 1949 (2b)
- *Sedo-Scleranthion* Br.-Bl. 1950 (31)

sed02 The name '*Sedo-Scleranthion all. nova*' was validly published in Braun-Blanquet (1949b). The original diagnosis of the alliance includes two associations, namely the '*Scleranthetо-Sempervivetum arachnoidei* Br.-Bl. *nom. nova*' and the '*Sedetum montanis ass. nova*'. The latter is a *nomen nudum* as there are neither relevés published nor any bibliographical reference made to any published relevés. As far as the '*Scleranthetо-Sempervivetum'* is concerned, there is a bibliographical reference to published relevés on pp. 268–273 in Chodat & Anand (1936) of the associations '*Sempervivetum arachnoidei'* and '*Festucetum ovinae*' with *Scleranthus annuus* and *Sempervivum arachnoideum*. Therefore, the name '*Scleranthetо-Sempervivetum arachnoidei*' (although it is a *nomen superfluum*) and the *Sedo-Scleranthion* were validly published. However, the pertinent publication date is not 1949 but 1950 because the bibliographical references had been published only in the sixth part of the paper in Braun-Blanquet (1950; ICPN art. 6) and the correct citations should then read: the '*Sclerantho-Sempervivetum arachnoidei* (Chodat et Anand 1936) Braun-Blanquet 1936 *nom. superfl.'* (ICPN art. 29) and the '*Sedo-Scleranthion* Braun-Blanquet 1950', respectively. (JPT) The publication of the same name by Braun-Blanquet (1955) was superfluous and the name should be considered as illegitimate according to the ICPN art. 31. (LM)

- *Sedo-Scleranthion* Br.-Bl. 1955 (31)
- *Sempervivo-Sedion* (Br.-Bl. 1955) T. Müller 1961 (29)
- *Rumici acetosellae-Scleranthion perennis* de Foucault 1999 (phantom)
- *Rumici acetosellae-Scleranthion perennis* de Foucault 2001 (3b)

SED-02C *Sedion anglici* Br.-Bl. in Br.-Bl. et Tx. 1952

Pioneer vegetation on acidic shallow soils on siliceous rocky outcrops of the atlantic regions of Europe

sed03 These communities are floristically and ecologically very similar to the *Thero-Airion*. Therefore Dengler (2004: 310) considers these two alliances to be synonymous. Within the *Thero-Airion*, the communities with *Sedum anglicum* could be recognized as a suballiance in its own right. (JD)

- *Hyperico linarifolii-Sedion reflexi* de Foucault in Julve 1993 (3b)
- *Hyperico linarifolii-Sedion reflexi* de Foucault 1999 (phantom)
- *Hyperico linarifolii-Sedion rupestris* de Foucault 1999 (phantom)
- *Hyperico linarifolii-Sedion rupestris* de Foucault 2001 (2b)

SED-02D *Sedion pyrenaici* Tx. in Rivas-Mart. et al. 2011

Pioneer vegetation on acidic shallow soils on siliceous rocky outcrops of the Pyrenees and the Western Iberian Peninsula

- *Sedion pyrenaici* Tx. 1954 (phantom)
- *Sedion pyrenaici* Tx. in Tx. et Oberd. 1958 (3b)
- *Sedion pyrenaici* Tx. ex Rivas-Mart. et al. 1984 (5)

SED-02E *Hyperico perforati-Scleranthion perennis* Moravec 1967

Boreo-montane silicicolous meso-xerophytic swards on shallow skeletal soils of Central and Eastern Europe, the British Isles and Fennoscandia

- *Tunico-Scleranthion* Csűrös et al. 1968 (syntax.syn.)
- *Senecioni-Rumicion acetosellae* Passarge 1981
- *Poo compressae-Rumicion acetosellae* Didukh et Kontar 1998 (syntax.syn.)
- *Thymo pulegioidis-Sedion sexangularis* Didukh et Kontar 1998 (syntax.syn.)
- *Petrorhagio-Scleranthion* Sanda et al. 2008 (2b, 5)

SED-02F *Scabioso-Trifolion dalmatici* Horvatić et N. Ranđelović in N. Ranđelović 1977

Open swards on shallow soils over siliceous rocky outcrops of the Southern and Central Balkans

- *Scabioso-Trifolion dalmatici* Horvatić et N. Ranđelović 1973 (phantom)
- *Scabioso-Trifolion dalmatici* N. Ranđelović et Horvatić 1974 (2b)
- *Scabioso-Trifolion dalmatici* Horvatić et N. Ranđelović in N. Ranđelović 1975 (2b)
- *Sedion stefco* V. Ranđelović in Jovanović et al. 2000 (2b, 3b)
- *Diantho pinifolii-Jasionion heldreichii* Bergmeier et al. 2009 (syntax.syn.)
- *Trifolion trichopteri* V. Ranđelović in Milosavlević et al. 2010 (2b)

SED-02G *Poo bulbosae-Stipion graniticolae* Vynokurov 2014

Open swards on shallows soils over granitic outcrops of Southern Ukraine

SED-03 *Thero-Airetalia* Rivas Goday 1964

Pioneer vegetation on acidic shallow soils of the winter-mild atlantic and subboreal regions of Western Europe, the Northern Iberian Peninsula and Madeira

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- *Thero-Airetalia* Krausch 1962 (2b, 3b)
- *Thero-Airetalia* Oberd. in Oberd. et al. 1967 (2b, 3b)

SED-03A *Thero-Airion* Tx. ex Oberd. 1957

Pioneer vegetation on acidic shallow soils of the winter-mild atlantic and subboreal regions of Western Europe, the northern Iberian Peninsula and Madeira

sed04 Rivas-Martínez et al. (1999, 2002b: 499) prefer classification of this alliance within the Mediterranean *Helianthemetalia guttatae*. EB supports this view as well while LM and JD disagree.

- *Thero-Airion* Tx. 1951 (2b)
- *Thero-Trifolion* Doing 1974 (2b)
- *Tuberario guttatae-Airion praecocis* de Foucault 1999 (phantom)
- *Tuberario guttatae-Airion praecocis* de Foucault 2001 (2b)

SED-04 *Alysso-Sedetalia* Moravec 1967

European temperate pioneer therophyte and stonecrop swards on calcareous shallow skeletal soils and base-rich sands

sed05 Tentatively the communities dominated by short-lived herbs and annual grasses of sandy-dune substrates in Central Europe (*Sileno conicae-Cerastion semidecandri* Korneck 1974, *Bassio laniflorae-Bromion tectorum* Borhidi 1996 *nom. conserv. propos.*) are classified within this order. Description of an order to accommodate these two alliances might be seen as a logical option. (LM)

- *Sedetalia albi micranthi* de Foucault 2001 (orig.form) (2b)

COOL-TEMPERATE GROUP OF ALLIANCES ON ROCKY SUBSTRATES

SED-04A *Alysso alyssoidis-Sedion* Oberd. et T. Müller in T. Müller 1961

Thermophilous stonecrop vegetation on weathered calcareous rocks of temperate Europe

- *Sedo-Teucrion* Doing 1963 (29a)
- *Alysso-Veronicion praecocis* Passarge 1977 (syntax.syn.)
- *Acino arvensis-Arenarion serpyllifoliae* de Foucault 1989
- *Valerianello-Veronicion arvensis* Passarge 1996
- *Allio sphaerocephali-Sedion albi* (Oberd. et T. Müller in T. Müller 1961) de Foucault 1999 (phantom)
- *Allio sphaerocephali-Sedion albi* (Oberd. et T. Müller in T. Müller 1961) de Foucault 2001 (8)
- *Gageo bohemicae-Sedion albi* (Oberd. 1957) de Foucault 1999 (phantom)
- *Gageo bohemicae-Sedion albi* (Oberd. 1957) de Foucault 2001 (syntax.syn.)
- *Sedo albi-Poion compressae* (Oberd. et T. Müller in T. Müller 1961) de Foucault 1999 (phantom)
- *Sedo albi-Poion compressae* (Oberd. et T. Müller in T. Müller 1961) de Foucault 2001 (5)
- *Teucrio botryos-Melicion ciliatae* (Korneck 1974) Royer 1987 (phantom)
- *Diantho gratianopolitani-Melicion ciliatae* (Korneck 1974) Royer 1987 (1)
- *Diantho gratianopolitani-Melicion ciliatae* (Korneck 1974) Royer 1991 (29a)

SED-04B *Tortello tortuosae-Sedion albi* Hallberg ex Dengler et Löbel 2006

Xeric basiphilous grasslands on shallow soils of Baltic alvars

- *Festucion alvarense* Albertson 1950 (34a)
- *Helianthemo-Globularion* Br.-Bl. 1963 p.p. (38)

sed06 See Remark *fes06*. (LM)

- *Anthyllido-Artemision campestris* Sunding in Marker 1969 (3b)
- *Tortello-Sedion* Hallberg 1971 (3b)
- *Helianthemo-Cetrarion* (Br.-Bl. 1963) Krahulec et al. 1986 (8)

SUBMEDITERRANEAN GROUP OF ALLIANCES OF ROCKY SUBSTRATES

SED-04C *Sedion micrantho-sediformis* Rivas-Mart., P. Sánchez et Alcaraz ex P. Sánchez et Alcaraz 1993

Pioneer therophyte and stonecrop swards of calcareous outcrops of the submediterranean Iberian Peninsula

- *Sedo-Paronychion* Tx. et Oberd. 1954 (phantom)
- *Sedo-Paronychion* Tx. et Oberd. 1958 (3b)
- *Sedion micrantho-sediformis* Rivas-Mart., P. Sánchez et Alcaraz in Alcaraz et al. 1991 (5)
- *Sedion micranthi* (O. de Bolòs 1981) De la Torre et al. 1996 (syntax.syn.)
- *Sedion micrantho-sediformis* de Foucault 2001 (8)

SED-04D *Armerion junceae* Br.-Bl. ex Br.-Bl. et al. 1952

Meso-xerophytic open swardson dolomite sands of Southern France

- *Armerion girardii* Br.-Bl. 1931 (*sensu* Julve 1993) (2b, *mut.illeg.*)
- *Armerion juncei* Br.-Bl. 1931 (orig.form) (2b)
- *Armerion girardii* Loisel 1971

SED-04E *Valerianion tuberosae* Guinochet 1975

Open herb-rich swards of calcareous shallow rubble soils in the submediterranean French Prealps

SED-04F *Aethionemion saxatilis* Bergmeier et al. 2009

Thermophilous open-sward vegetation of the calcareous and metalliferous rock outcrops of the submediterranean Northern Hellas

TEMPERATE GROUP OF ALLIANCES OF SANDY SUBSTRATES

SED-04G *Sileno conicae-Cerastion semidecandri* Korneck 1974

Central European annual open swards on stablized base-rich inland sand dunes

- *Androsaco septentrionali-Cerastion semidecandri* Głowacki 1988

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SED-04H *Bassio laniflorae-Bromion tectorum* Borhidi 1996 *nom. conserv. propos.*

Pannonian annual open swards on base-rich sandy substrates

sed07 This name becomes an obvious candidate for conservation in case the *Bromion tectorum* Soó ex Felföldy 1942 becomes rejected as *nomen ambiguum*. (LM) The *Bassio laniflorae-Bromion tectorum* is considered to be syntaxonomically synonymous with of the *Sileno conicae-Cerastion semidecandri* by some authors. (JD)

- *Bromion tectorum* Soó von Bere 1940 (2b)
- *Bromion tectorum* Soó ex Felföldy 1942 *nom. ambig. rejic. propos.* (36)

sed08 The suggestion (and motivation) to reject the name *Bromion tectorum* Soó ex Felföldy 1942 was published by Mucina & Kolbek (1993a: 499; see also Theurillat 1997). (LM)

- *Festuco-Mollugion* Borza 1963 (2b)

GER *Trifolio-Geranietea sanguinei* T. Müller 1962

Thermophilous forest fringe and tall-herb vegetation in nutrient-poor sites in the submediterranean to subboreal zones of Europe and the Macaronesia

ger01 Chytrý (2007) did not accept this class and classified a part of its syntaxonomic content into the *Festuco-Brometea*, based on considerable floristic similarity and its enormous heterogeneity as it includes alliances of dry herbaceous vegetation related to the *Festuco-Brometea*, alliances of mesic vegetation related to the *Arrhenatheretalia*, alliances of oligotrophic grasslands related to the *Nardetalia*, and alliances of disturbed vegetation related to the *Epilobietea angustifolii*. (LM, MC)

- *Trifolio-Geranietea sanguinei* T. Müller 1961 (2b)
- *Origano-Geranietea sanguinei* van Leeuwen et Westhoff 1961 (2b)
- *Geranietea sanguinei* Géhu 1975 (2b)
- *Trifolietea medii* van Gils et Kovács 1977 (2b, 3b)
- *Melampyro-Holcetea mollis* Passarge 1979 (3b)
- *Melampyro-Holcetea mollis* Passarge ex Klauck 1992 (8)
- *Melampyro-Holcetea mollis* Passarge 1994 (3g)
- *Holco lanati-Stellarietea holosteae* Géhu 2000 (syntax.syn.)
- *Antherico ramosi-Geranietea sanguinei* Julve ex Dengler in Dengler et al. 2003 (*sensu* Rivas-Martínez et al. 2011: 257) (phantom)

GER-01 *Origanetalia vulgaris* T. Müller 1962

Meso-subxerophytic fringe and tall-herb vegetation on nutrient-poor but base-rich soils of temperate and subboreal Europe

- *Origanetalia vulgaris* T. Müller 1961 (2b)
- *Trifolio-Origanetalia* (T. Müller 1961) Zimmermann et al. 1989 (2b)
- *Agrimonio eupatoriae-Trifolietalia medii* Julve 1993 (2b)

GER-01A *Knaution dipsacifoliae* Julve ex Dengler et Boch 2008

Meso-subxerophytic fringe vegetation on nutrient-poor but base-rich soils at higher altitudes of temperate Europe and subboreal Scandinavia

- *Knaution gracilis* Julve 1993 (2b)
- *Knaution dipsacifoliae* Julve ex Dengler in Dengler et Krebs 2003 (3b)

GER-01B *Trifolion medii* T. Müller 1962

Meso-subxerophytic fringe vegetation on nutrient-poor but base-rich soils at lower altitudes of temperate Western and Central Europe

- *Origanion* Doing 1963 (2b)
- *Trifolion medii* T. Müller 1961 (2b)
- *Knautio arvensis-Agrimonion eupatoriae* Julve 1993 (5)
- *Geranio nodosi-Digitalidion luteae* Biondi, Vagge et Galdenzi in Biondi et al. 2014 (orig.form) (syntax.syn.)

GER-01C *Violion kitaibelianae* Ubaldi 2011

Mesophilous tall-herb vegetation on nutrient-poor but base-rich soils of the fringes and clearings of deciduous forests in the submontane and lower montane belts of the Apennines

- *Lathyro pratensis-Trifolion medii* Ubaldi 2011 (syntax. syn.)
- *Digitali australis-Helleborion bocconei* Biondi, Vagge et Galdenzi in Biondi et al. 2014 (syntax. syn.)
- *Digitalidi australis-Trifolion medii* (Čarni 2005) Biondi, Vagge et Galdenzi in Biondi et al. 2015 (29c)

GER-02 *Antherico ramosi-Geranietalia sanguinei* Julve ex Dengler in Dengler et al. 2003

Xerophilous fringe and tall-herb vegetation on nutrient-poor and base-rich soils in the submediterranean, temperate and subboreal zones of Europe

- *Antherico ramosi-Geranietalia sanguinei* Julve 1993 (2b)
- *Violo dehnhardtii-Cruciatetalia glabrae* Ubaldi 2011 (syntax. syn.)

GROUP OF COOL-TEMPERATE ALLIANCES

GER-02A *Geranion sanguinei* Tx. in T. Müller 1962

Xerophilous fringe and tall-herb vegetation of subcontinental Western and Central Europe

- *Geranion sanguinei* Tx. in T. Müller 1961 (2b)
- *Cynancho-Geranion* (Tx. in T. Müller 1962) Dierschke 1974 (29)
- *Brachypodio pinnati-Geranion* (Tx. in T. Müller 1962) van Gils et Kozłowska 1977 (29)
- *Tanaceto corymbosi-Bupleurion falcati* Julve 1993 (5)

GER-02B *Galio littoralis-Geranion sanguinei* Géhu et Géhu-Franck in de Foucault et al. 1983

Xerophilous fringe and tall-herb vegetation of the temperate Atlantic and Baltic seaboards and subboreal Southern Fennoscandia

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- *Galio litoralis-Geranion sanguinei* Géhu et Géhu-Franck in de Foucault et al. 1983 (2b)
- *Galio litoralis-Geranion sanguinei* Géhu et Géhu-Franck 1983 (2b, 3b)
- *Galio maritimi-Geranion sanguinei* Géhu et Géhu-Franck 1983 (2b, *mut.superfl.*)
- *Galio veri-Geranion sanguinei* Géhu et Géhu-Franck in de Foucault et al. 1983 *nom. mut. propos.* (45)

GROUP OF SUBMEDITERRANEAN ALLIANCES

GER-02C *Dictamno albi-Ferulagion galbaniferae* (van Gils et al. 1975) de Foucault et al. ex Čarni et Dengler in Mucina et al. 2009

Xerophilous fringe and tall-herb vegetation of the Illyrian and Dinaric regions of the Balkan Peninsula

ger02 For details of the nomenclature of this name see Mucina et al. (2009). (LM)

- *Dictamno albi-Ferulagion galbaniferae* (van Gils et al. 1975) de Foucault et al. 1983 (5)

GER-02D *Lathyro laxiflori-Trifolion velenovskyi* (Čarni et al. 2000) Čarni 2005

Subxerophilous fringe vegetation of the Southern and Central Balkans

GER-03 *Asphodeletalia macrocarpae* Biondi et Allegrezza in Biondi et al. 2014

Meso-xerophilous fringe and tall-herb vegetation on deep oligotrophic soils in the meso- and supratemperate belts of the Southern European peninsulas

ger03 The acceptance of this order is only tentative, pending further research on fringe communities of the Mediterranean woodlands and scrub. (LM)

GER-03A *Stachyo lusitanicae-Cheirolophion sempervirentis* (Capelo 1996) Capelo in Di Pietro et al. 2015

Neutro-acidophilous to basiphilous fringe vegetation in the mesomediterranean belt of the southwestern Iberian Peninsula

GER-03B *Thalictro aquilegiifolii-Asphodelion macrocarpi* Allegrezza et al. 2015

Meso-xerophilous fringe and tall-herb vegetation on deep oligotrophic soils over calcareous substrates in the lower supratemperate belts of the Central Apennine Peninsula

GER-03C *Cyano triumfetti-Asphodelion macrocarpae* Biondi et Allegrezza in Biondi et al. 2014

Meso-xerophilous fringe and tall-herb vegetation on deep oligotrophic soils over calcareous substrates in the upper supratemperate belts of the Central Apennine Peninsula

GER-03D *Hyperico calabricae–Asphodelion macrocarpi* Biondi, Gangale et Uzunov in Biondi et al. 2014

Meso-xerophilous fringe and tall-herb vegetation on deep oligotrophic soils over siliceous substrates in the meso- and supratemperate belts of the Southern Apennine Peninsula and Sicily

GER-04 *Ranunculo cortusifolii-Geranietalia canariensis* Capelo et Mucina in Di Pietro et al. 2015

Mesophilous herb-rich fringe vegetation of the Macaronesian evergreen laurisilva

GER-04A *Ranunculo cortusifolii-Geranion canariensis* Rivas-Mart. et al. 1993

Mesophilous herb-rich fringe vegetation of the Macaronesian evergreen laurisilva

GER-04B *Pericallion malvifoliae* Fernández Prieto, Dias et Aguiar in Fernández Prieto et al. 2012

Mesophilous forest fringe vegetation in the semi-shaded habitats at low and mid-altitudes of the Azores

GER-05 *Melampyro-Holcetalia mollis* Passarge in Theurillat et al. 1995

Meso-xerophytic fringe and tall-herb on acidic soils in the submediterranean to subboreal zones of Europe

ger04 This order forms, in the view of some French authors (e.g. Bardat et al. 2004; Royer et al. 2006), the basis for the recognition of a class in its own right – the *Melampyro-Holcetea mollis* Passarge ex Klauck 1992. (LM)

- *Melampyro-Holcetalia mollis* Passarge 1975 (5)
- *Teucrietalia scorodoniae* de Foucault et al. 1983 (3b)
- *Teucrio scorodoniae-Melampyretalia pratensis* Klauck 1992 (5)
- *Stellarietalia holosteae* Géhu 2000 (syntax.syn.)
- *Teucrio-Pteridietalia* Géhu et Bioret 2000 (5)
- *Galio saxatilis-Holcetalia mollis* Passarge 2002 (5)
- *Teucrio scorodoniae-Melampyretalia pratensis* Passarge 2002 (syntax.syn.)

GROUP OF COOL-COLD TEMPERATE ALLIANCES

GER-05A *Melampyrion pratensis* Passarge 1979

Meso-xerophytic forest-edge communities on acidic soils in semi-shady to sunny habitats of temperate and (sub)boreal Europe

- *Melampyrion pratensis* Passarge 1967 (3b)
- *Melampyro sylvatici-Poion chaixii* Julve 1993 (5)
- *Melampyro sylvatici-Poion chaixii* Julve ex Boullet et Rameau in Bardat et al. 2004 (syntax.syn.)
- *Agrostio capillaris-Peucedanion oreoselini* Reichhoff et Warthemann 2003 (syntax.syn.)

GER-05B *Violo rivinianae-Stellarion holosteae* Passarge 1994

Mesophilous fringe and tall-herb vegetation on slightly humic acidic soils of Western and Central Europe

- *Hyacinthoido non-scriptae-Stellarion holosteae* Géhu 2000 (syntax.syn.)

GER-05C *Poion nemoralis* Dengler et al. 2006

Mesophilous forest-edge vegetation on slightly acidic soils in shady habitats of temperate Europe

GER-05D *Teucrion scorodoniae* de Foucault et al. 1983

Mesophilous tall-herb fringe vegetation on acidic soils of the atlantic regions of Europe

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- *Conopodio majoris-Teucrion scorodoniae* Julve 1993 (5)
- *Veronico officinalis-Hieracion murorum* Passarge 2002 (syntax.syn.)
- *Conopodio majoris-Teucrion scorodoniae* Julve ex Boullet et Rameau in Bardat et al. 2004 (syntax.syn.)

GROUP OF WARM-TEMPERATE ALLIANCES

GER-05E *Linarion triornithophorae* Rivas-Mart. et al. 1984

Acidophilous forest fringe vegetation in the supratemperate and meso-supramediterranean belts of the Northern Iberian Peninsula

GER-05F *Origanion virentis* Rivas-Mart. et O. de Bolòs in Rivas-Mart. et al. 1984

Acidophilous xeric fringe and tall-herb vegetation in the mesomediterranean belt of the Iberian Peninsula

GER-05G *Luzulo sieberi-Brachypodion genuensis* Allegrezza et Biondi in Biondi et al. 2015

Acidophilous mesophilous fringe vegetation in the supratemperate belt of the Apennine Peninsula

ger05 The suggested classification of this alliance within the (calcicolous) mediterranean order *Asphodeletalia macrocarpi* (see Biondi et al. 2015) is not appropriate since. The vegetation of this alliance occurs thermo-climatically in the 'upper supratemperate' – hence it is of submediterranean character. (LM, RDP)

GER-05H *Digitali ferrugineae-Pteridion aquilini* Biondi et Casavecchia in Biondi et al. 2014

Acidophilous forest fringe and tall-herb vegetation of abandoned grasslands developed on decalcified soils in the colline and montane belts of the Apennines

MOL *Molinio-Arrhenatheretea* Tx. 1937

Anthropogenic managed pastures, meadows and tall-herb meadow fringes on fertile deep soils at low and mid-altitudes (rarely also high altitudes) of Europe

- *Molinieto-Arrhenatheretales* (Br.-Bl. 1930) Tx. 1937 (orig.form.) (11)
- *Arrhenatheretea* Br.-Bl. in Br.-Bl. et al. 1947 (2b)
- *Molinio-Juncetea acutiflori* Br.-Bl. in Br.-Bl. et al. 1947 (2b)
- *Arrhenatheretea* Br.-Bl. 1950 (2b)
- *Molinio-Juncetea acutiflori* Br.-Bl. 1950 (syntax.syn.)

mol01 The '*Molinio-Juncetea*' in Braun-Blanquet (1949b) is validly published with the indication of the bibliographical reference to the publication of the *Molinietalia* Koch 1926 published in the final part of the paper (Braun-Blanquet 1950). Therefore, the date of the name is not 1949 but 1950 (ICPN art. 6) and the correct citation of the name is '*Molinio-Juncetea* Br.-Bl. 1950'. The priority between the two names (*Molinio-Juncetea* Br.-Bl. 1950 and *Molinio-Juncetea* Br.-Bl. ex A. Bolòs et Bolòs in A. Bolòs y Vayreda 1950) is still to be determined. (JPT)

- *Molinio-Juncetea acutiflori* Br.-Bl. ex A. Bolòs y Vayreda et O. de Bolòs in A. Bolòs y Vayreda 1950 (syntax.syn.)

mol02 The '*Molinio-Juncetea* Br.-Bl. 1947' (*recte: Molinio-Juncetea* Br.-Bl. ex A. Bolòs y Vayreda et O. de Bolòs in A. Bolòs y Vayreda 1950) is validly published in Bolòs y Vayreda (1950) with the unique order of the '*Holoschoenetalia* Br.-Bl. 1930' *(recte: Holoschoenetalia* Br.-Bl. ex A. Bolòs y Vayreda et O. de Bolòs in A. Bolòs y Vayreda 1950 *nom. illeg.*; IPCN art. 31), original diagnosis of which contains unique alliance – the '*Molinio-Holoschoenion* Br.-Bl. 1930' (recte: *Molinio-Holoschoenion* A. Bolòs y Vayreda et O. de Bolòs in A. Bolòs y Vayreda 1950 *nom. illeg.*, IPCN art. 31) that is validly published with the 'asociación de *Holoschoenus* y *Cirsium monspessulanum* Br.-Bl.' (*recte: Holoschoeno-Cirsietum monspessulani* Br.-Bl. ex A. Bolòs y Vayreda et O. de Bolòs in A. Bolòs y Vayreda 1950 *nom. superfl.*). (JPT)

- *Plantaginetea majoris* Tx. et Preising in Tx. 1950 (2b)
- *Plantaginetea majoris* Tx. et Preising ex von Rochow 1951 (syntax.syn.)
- *Arrhenatheretea* Br.-Bl. ex Br.-Bl. et al. 1952 (syntax. syn.)
- *Molinio-Juncetea elatioris* Br.-Bl. ex Br.-Bl. et al. 1952 (syntax.syn.)
- *Mesobrometo-Arrhenatheretea* Doing 1963 (orig.form) (2b)
- *Agrostietea stoloniferae* Oberd. in Oberd. et al. 1967 (2b)
- *Agrostietea stoloniferae* T. Müller et Görs in Görs 1968 (2b)
- *Agrostietea stoloniferae* T. Müller et Görs 1969 (syntax. syn.)
- *Lathyro-Vicietea craccae* Passarge 1975 (syntax.syn.)

mol03 Here we choose the *Galio-Achilleetalia millefoliae* (Passarge 1975) as the *lectotypus* of the *Lathyro-Vicietea craccae* Passarge 1975. (LM)

- *Agrostietea stoloniferae* Oberd. in Oberd. et al. ex Oberd. 1983 (5)

mol04 The only order ('*Agrostietalia stoloniferae* Oberd. in Oberd. *et al.* 1967') that is cited in the protologue of this class is invalid. Hence, although this would be the only syntaxonomic element to typify this class, this automatic typification cannot be recognized as admissible. (LM)

- *Lythro salicariae-Filipenduletea* Passarge 1988
- *Agrostio stoloniferae-Arrhenatheretea* (Tx. 1937) de Foucault 1989 (29)
- *Valeriano-Filipenduletea* Preising et al. 1993
- *Agrostietea stoloniferae* Asri et Ghorbanli 1997 (2b)
- *Agrostio stoloniferae-Arrhenatheretea elatioris* de Foucault in de Foucault et Catteau 2012 (5)

mol05 De Foucault & Catteau (2012) chose a sub-class (instead of order!) as the *typus nominis*, hence rendered the name *Agrostio stoloniferae-Arrhenatheretea elatioris* invalid. (LM)

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GROUP OF ORDERS OF TEMPERATE MESIC AND SUB-XERIC MEADOWS AND PASTURES

MOL-01 *Arrhenatheretalia elatioris* Tx. 1931

Mown meadows and pastures on well-drained mineral soils at low and mid-altitudes of temperate and subboreal Europe

- *Arrhenatheretalia* Pawłowski et al. 1928 (2b)
- *Arrhenatheretalia* Br.-Bl. 1931 (2b)
- *(Trifolio-)Arrhenatheretalia* Oberd. 1949 (orig.form) (2b)
- *Lolietalia perennis* Doing 1963 (2b)
- *Trifolio-Cynosuretalia* Sougnez et Limbourg 1963 (syntax.syn.)
- *Cynosuro-Phleetalia pratensis* Passarge 1969 (Regionalordnung) (3d)
- *Festuco-Arrhenatheretalia* (Pawłowski et al. 1928) Passarge 1969 (2b)
- *Trifolio-Phleetalia* (Sougnez et Limbourg 1963) Passarge 1969 (29)
- *Galio-Achilleetalia millefoliae* Passarge 1975 (syntax.syn.)
- *Cynosuretalia cristati* de Foucault 1989
- *Plantagini-Lolietalia* Mucina 1991 (2b)
- *Plantagini-Prunelletalia* Ellmauer et Mucina 1993 (2b)

COOL TEMPERATE GROUP OF ALLIANCES

MOL-01A *Arrhenatherion elatioris* Luquet 1926

Mesic mown meadows on mineral-rich soils in the lowland to submontane belts of temperate Europe

- *Arrhenatherion elatioris* Koch 1926 (2b)
- *Arrhenatherion* Br.-Bl. 1931 (2b)
- *Arrhenatherion elatioris* Tx. 1931 (31)
- *Agrostio-Festucion rubrae* Passarge 1969 (syntax.syn.)
- *Polygalo-Festucion rubrae* Passarge 1969 (Regionalverband) (3d)
- *Dauco-Arrhenatherion* Passarge 1969 (Regionalverband) (3d)
- *Phyteumato-Festucion rubrae* Passarge 1969 (Regionalverband) (3d)
- *Triseto-Arrhenatherion* Passarge 1969 (syntax.syn.)
- *Anthrisco-Heracleion* Passarge 1975 (syntax.syn.)
- *Hyperico-Vicion angustifoliae* Passarge 1975 (syntax.syn.)
- *Festucion pratensis* Sipailova et al. 1985 (syntax.syn.)

MOL-01B *Phyteumato-Trisetion* Ellmauer et Mucina 1993

Mesic mown meadows on relatively mineral-poor soils in the submontane and montane belts of Central Europe

- *Phyteumato-Trisetion flavescentis* Hundt ex Passarge 1969 (Regionalverband) (3d)

MOL-01C *Cynosurion cristati* Tx. 1947

Mesic pastures on well-drained mineral-rich soils at low to mid-altitudes of temperate Europe

mol06 A proposal to conserve the name *Cynosurion cristati* Tx. 1947 against the name *Lolion perennis* Felföldy 1942 was made by Chytrý & Blažková in Chytrý (2007: 195, 197). (LM)

- *Lolion perennis* Felföldy 1942 *nom. ambig. rejic. propos.* (36)

mol07 A proposal to reject (as *nomen ambiguum*) the name *Lolion perennis* Felföldy 1942 was made by Ellmauer & Mucina (1993: 356; see also Theurillat 1997). (LM)

- *Achilleo-Cynosurion* Passarge 1969 (syntax.syn.)
- *Alchemillo-Cynosurion* Passarge 1969 (Regionalverband) (3d)
- *Bromo mollis-Cynosurion* Passarge 1969 (Regionalverband) (3d)
- *Cardamino pratensis-Cynosurion* Passarge 1969 (Regionalverband) (3d)
- *Eu-Ranunculo-Cynosurion* Passarge 1969 (Regionalverband) (3d)
- *Eu-Thymo-Cynosurion* Passarge 1969 (Regionalverband) (3d)
- *Lolio perennis-Plantaginion majoris* Sissingh 1969 (syntax.syn.)
- *Ranunculo repentis-Cynosurion* Passarge 1969 (syntax.syn.)
- *Sanguisorbo minoris-Cynosurion* Passarge 1969 (Regionalverband) (3d)
- *Thymo-Cynosurion* Passarge 1969 (syntax.syn.)
- *Lolion perennis* Resmeriţă et Pop 1972 (31)
- *Phleo-Leontodontion* (Br.-Bl. et Berset 1957) Dietl 1972
- *Lolio-Cynosurion* Jurko 1974 (orig.form) (corresp.; as suballiance)
- *Alchemillo-Trifolion repentis* Passarge 1976 (syntax.syn.)
- *Trifolio repentis-Lolion perennis* Dietl 1983
- *Alchemillo xanthochlorae-Cynosurion* (Passarge 1969) de Foucault 1989 (29)
- *Rumici crispi-Cynosurion cristati* de Foucault 1989
- *Ranunculo sardoi-Plantaginion intermediae* Julve 1993 (5)

MOL-01D *Alchemillo-Ranunculion repentis* Passarge 1979

Slightly trampled herb-rich grasslands in shaded habitats of the temperate and subboreal regions of Europe

- *Plantagini-Prunellion* Eliáš 1980 (syntax.syn.)

ATLANTIC-SUBMEDITERRANEAN GROUP OF ALLIANCES

MOL-01E *Brachypodio-Centaureion nemoralis* Br.-Bl. 1967

Mesic mown meadows on mineral-rich soils of the thermo-atlantic and submediterranean regions of Western Europe

- *Lino biennis-Gaudinion fragilis* (Br.-Bl. 1967) de Foucault 1989 (29)
- *Gaudinio fragilis-Cynosurion cristati* (Rivas Goday et Rivas-Mart. 1963) Géhu 2006 (5)

MOL-01F *Salvio pratensis-Dactylidion glomeratae* Ubaldi et al. in Ubaldi 2003

Mesic mown meadows on mineral-rich soils of the submediterranean regions of the Apennine Peninsula

- *Ranunculo neapolitani-Arrhenatherion elatioris* Allegrezza et Biondi 2011 (5)

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MOL-01G *Rumicion thyrsiflori* Micevski 1994
Mesic mown meadows on mineral-rich soils of the submediterranean regions of the Central Balkans
MOL-01H *Trifolio pratensis-Brizion elatioris* Didukh et Kuzemko 2009
Mesic mown meadows on well-drained soils of forest clearings in the mountains of submediterranean Crimea

MOL-02 *Galietalia veri* Mirkin et Naumova 1986
Steppic meadows on rarely flooded river terraces in the steppe and forest-steppe zones of Eastern Europe, and Western and Central Siberia
mol08 The *Galietalia veri* represents a special type of Eastern European and Siberian meadow vegetation. The vegetation of this order occurs for JPT in Eastern Europe and Western Siberia, on high-elevated alluvial river terraces. (NE) Basic attributes of this order are: (1) subxeric meadows; (2) highly variable moisture regime including occasional spring flooding and summer dry; (3) continental climate; (4) presence of the *Molinio-Arrhenathereta* and *Festuco-Brometea* species; (5) absence of many European dominants typical of the *Arrhenatheretalia* (e.g. *Anthoxanthum odoratum, Arrhenatherum elatius, Bellis perennis, Cynosurus cristatus, Holcus lanatus,* etc.). This vegetation covers vast area and it deserved recognition on a high-rank level. (AS) The communities classified within *Galietalia veri* mostly should belong to the *Festuco-Brometea* (*Brachypodietalia pinnati*) and the *Koelerio-Corynephoretea,* and to a smaller extent probably also to the *Trifolio-Geranietea* and the *Molinio-Arrhenatheretea* (*Arrhenatheretalia elatioris*). Whether there is a case for recognition of the *Galietalia veri* remains open for further studies. (JD) Nomenclatural notes on this order are found in Kuzemko (2009). (LM)
- *Poo-Agrostietalia vinealis* Shelyag-Sosonko et al. 1985 (2b)
- *Carici praecocis-Elytrigietalia pseudocaesiae* V. Solomakha et al. 2005 (syntax.syn.)

MOL-02A *Agrostion vinealis* Sipailova et al. 1985
Steppic meadows on intermittently wet floodplains of the Dnieper River basin
- *Poion angustifoliae* Shelyag-Sosonko et V. Solomakha 1983 (2b, 5)
- *Galio veri-Aristolochion clematidis* Shevchyk et V. Solomakha in Shevchyk et al. 1996 (syntax.syn.)
- *Potentillo argenteae-Poion angustifoliae* V. Solomakha 1996 (syntax.syn.)
- *Scabioso ochroleucae–Poion angustifoliae* Bulokhov 2001 (syntax.syn.)
- *Carici praecocis-Elytrigion pseudocaesiae* V. Solomakha et al. 2005 (syntax.syn.)
- *Lythro virgati-Elytrigion pseudocaesiae* Shapoval 2006 (29)

MOL-02B *Artemision ponticae* Golub et Saveleva in Golub 1995
Steppic meadows on intermittently wet floodplains of the Don River valley
- *Artemision ponticae* Golub et Saveleva 1988 (1)

MOL-02C *Trifolion montani* Naumova 1986
Steppic meadows on rarely flooded river terraces of the Southern Urals and Western Siberia
- *Seselion libanotis* Ageleuov et Golub 1989 (1)
- *Agrostio-Avenulion schellianae* Royer 1991 (2b, 5)
- *Seselion libanotis* Ageleulov et Golub in Golub 1995 (syntax.syn.)

MOL-03 *Poo alpinae-Trisetetalia* Ellmauer et Mucina 1993
High-altitude mesic hay meadows and pastures in the mountain ranges of the nemoral zone of Europe
- *Poo-Phleetalia alpini* Passarge 1969 (Regionalordnung) (3d)

TEMPERATE EUROPEAN GROUP OF ALLIANCES
MOL-03A *Triseto flavescentis-Polygonion bistortae* Br.-Bl. et Tx. ex Marschall 1947
Montane-supramontane hay meadows on fertile mineral-rich soils of Central European mountain ranges
- *Polygono bistortae-Trisetion flavescentis* Br.-Bl. et Tx. ex Marschall 1947 *nom. invers. propos.* (42)

mol09 A proposal to invert the name is of an earlier date. This suggestion has been lately formally reinforced by Blažková & Chytrý in Chytrý (2007: 188) and Rivas-Martínez et al. (2011: 295). (LM)
- *Rumici-Trisetion flavescentis* Passarge 1969 (Regionalverband) (3d)
- *Triseto flavescentis-Arrhenatherion* Passarge 1969 (syntax. syn.)
- *Triseto flavescentis-Polygonion bistortae* Br.-Bl. et Tx. 1943 (2b)

MOL-03B *Poion alpinae* Gams ex Oberd. 1950
Cattle pastures of fertile soils in the subalpine belt of the Alps and the Carpathians
- *Poion alpinae* Rübel 1933 (2b)
- *Poion alpinae* Gams 1936 (2b)
- *Achilleo-Poion alpinae* (Gams ex Oberd. 1950) Passarge 1969 (29)
- *Astero bellidiastri-Poion alpinae* Passarge 1969 (Regionalverband) (3d)
- *Carlino-Poion alpinae* Passarge 1969 (syntax.syn.)
- *Eu-Achilleo-Poion alpinae* Passarge 1969 (Regionalverband) (3d)
- *Eu-Carlino-Poion alpinae* Passarge 1969 (Regionalverband) (3d)
- *Eu-Rumici-Poion alpinae* Passarge 1969 (Regionalverband) (3d)

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- *Phleo alpini-Poion alpinae* Passarge 1969 (Regionalverband) (3d)
- *Ranunculo-Poion alpinae* Passarge 1969 (Regionalverband) (3d)
- *Rumici-Poion alpinae* Passarge 1969 (syntax.syn.)

MOL-03C *Poion supinae* Rivas-Mart. et Géhu 1978

Heavily-trampled pastures at high altitudes of the mountain ranges of temperate Europe

- *Poion annuae* Rübel 1933 (2b)
- *Poion variae* Tx. 1950 (2b)
- *Alchemillo-Poion supinae* Ellmauer et Mucina 1993 (syntax.syn.)

SOUTH EUROPEAN GROUP OF ALLIANCES

MOL-03D *Violion cornutae* Nègre 1972

Mesic montane meadows on fertile mineral soils of the Pyrenees

- *Violion cornutae* Romo 1986 (2b)

MOL-03E *Pancicion serbicae* Lakušić 1966

Mesic montane meadows on fertile mineral soils of the Central Balkans

- *Pancicion serbicae* Lakušić 1964 (1)

MOL-03F *Helictotricho compressi-Bistortion officinalis* Didukh et Kuzemko 2009

Mesic montane pastures (yailas) on deep humus-rich soils in karst dolinas of Crimea

MOL-03G *Astrantion maximae* Korotkov 2013

Mesic subalpine meadows on nutrient-rich calcareous soils of the Central Caucasus

- *Astrantion maximae* Korotkov et Tsepkova 1991 (2b)

MOL-04 *Carici macrourae-Crepidetalia sibiricae* Ermakov et al. 1999

Mesic meadows on fertile soils in the continental forest-steppe zone of the Southern Urals and Western Siberia

MOL-04A *Polygonion krascheninnikovii* Kashapov 1985

Meadows rich in tall herbs on fertile mineral soils in the montane zone of the Southern Urals

GROUP OF ORDERS OF TEMPERATE WET MEADOWS AND TALL-HERB MEADOW FRINGES

MOL-05 *Molinietalia caeruleae* Koch 1926

Wet mown meadows on mineral and peaty soils in the temperate to subarctic zones of Europe

- *Molinietalia* Rübel 1933 (2b)
- *Deschampsietalia cespitosae* Horvatić 1956 (phantom)
- *Deschampsietalia cespitosae* Horvatić 1958 (syntax.syn.)
- *Molinio-Sanguisorbetalia* Doing 1963 (2b)
- *Alchemillo-Deschampsietalia cespitosae* Passarge 1976 (syntax.syn.)

mol10 Here (*hoc loco*) we choose the *Caltho-Deschampsion caespitosae* (Passarge 1976) as the *lectotypus* of the *Alchemillo-Deschampsietalia caespitosae* Passarge 1976. (LM)

- *Eleocharitetalia palustris* de Foucault 1984 (1)
- *Loto uliginosi-Cardaminetalia pratensis* Julve 1993 (2b)
- *Eleocharitetalia palustris* de Foucault in Royer et al. 2006 (2b, 5)
- *Eleocharitetalia palustris* de Foucault 2009 (syntax.syn.)

mol11 The *Eleocharitetalia* is a unit of transitional position between the *Phragmito-Magnocaricetea*, and the *Molinio-Arrhenatheretea* and it is well characterized by presence of both meadow species on one hand and by absence of aquatic plants on the other. (KŠ, LM) The placement of this syntaxonomic concept as a synonym of the *Agrostietalia stoloniferae*, as suggested by Rivas-Martínez et al. (2002a), is not supported. De Foucault & Catteau (2012) considered this unit synonymous with the '*Deschampsietalia caespitosae*' and therefore we classify this unit within the *Molinietalia* (the current concept encompassing the '*Deschampsietalia caespitosae*'. (LM, MH)

WESTERN AND CENTRAL EUROPEAN GROUP OF ALLIANCES

MOL-05A *Molinion caeruleae* Koch 1926

Mown meadows on temporarily wet soils at low altitudes of temperate Western and Central Europe

- *Juncion acutiflori* Br.-Bl. in Br.-Bl. et al. 1947 (2b)
- *Molinio-Juncion acutiflori* Duvigneaud 1949 (syntax.syn.)
- *Juncion acutiflori* Br.-Bl. in Br.-Bl. et Tx. 1952 (syntax. syn.)
- *Eu-Molinion* Doing 1963 (2b)
- *Magnojuncion* Doing 1963 (2b)
- *Serratulo-Molinion* Doing 1963 (2b)
- *Junco subuliflori-Molinion* Westhoff in Westhoff et Den Held 1969 (syntax.syn.)
- *Polygono bistortae-Juncion acutiflori* de Foucault et Géhu 1980

MOL-05B *Calthion palustris* Tx. 1937

Herb-rich temporarily wet mown meadows on mineral soils at low altitudes of suboceanic Western and subcontinental Central Europe

- *Carici-Calthion* Doing 1963 (2b)
- *Caltho-Deschampsion caespitosae* Passarge 1976 (syntax. syn.)

mol12 Here we designate the *Trollio-Cirsietum heterophylli (*Passarge 1976) as the *lectotypus (hoc loco)* of the *Caltho-Deschampsion caespitosae* Passarge 1976. (LM)

MOL-05C *Bromion racemosi* Tx. in Tx. et Preising ex de Foucault 2009

Herb-rich temporarily wet mown meadows on mineral soils at low altitudes of the oceanic regions of Western Europe

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- *Bromion racemosi* Tx. in Tx. et Preising 1951 (2b)
- *Lychno-Bromion racemosi* Doing 1963 (orig.form) (2b)

EASTERN EUROPEAN GROUP OF ALLIANCES

MOL-05D *Deschampsion cespitosae* Horvatić 1930

Mown temporarily wet meadows on heavy soils on floodplains in the forest and forest-steppe zones of (sub)continental Central and Eastern Europe

- *Agrostion albae* Soó 1941
- *Alopecurion pratensis* Passarge 1964 (syntax.syn.)
- *Cnidion venosi* Bal.-Tul. 1965
- *Cnidion venosi* Bal.-Tul. 1966 (syntax.syn.)
- *Cnidion dubii* Bal.-Tul. 1966 *nom. mut. propos.* (45)
- *Deschampsio-Alopecurion* Mirkin et Naumova 1986 (syntax.syn.)

MOL-05E *Conioselinion tatarici* Golub et al. 2003

Wet herb-rich meadows in supralittoral habitats of the subarctic seaboards of the White Sea

GROUP OF ALLIANCES ON ALLUVIA WITH PROLONGED INUNDATION

MOL-05F *Oenanthion fistulosae* de Foucault 2009

Floodplain mown meadows under influence of prolonged inundation at low altitudes of the winter-mild regions of Western Europe

- *Oenanthion fistulosae* de Foucault 1984 (1)
- *Oenanthion globulosae* de Foucault 1984 (1)
- *Alopecuro bulbosi-Oenanthion fistulosae* Julve 1989 (1)
- *Carici distichae-Oenanthion fistulosae* Julve 1993 (3b)
- *Oenanthion fistulosae* de Foucault in Royer et al. 2006 (2b, 5)
- *Ranunculo ophioglossifolii-Oenanthion fistulosae* de Foucault in de Foucault et Catteau 2012 (syntax.syn.)
- *Oenanthion globulosae* de Foucault in de Foucault et Catteau 2012 (syntax.syn.)

MOL-05G *Eleocharition palustris* Mirkin et Naumova 1986

Mown floodplain wet meadows on heavy soils in the steppe zone of the Southern Urals and Western Siberia

MOL-06 *Trifolio-Hordeetalia* Horvatić 1963

Amphiadriatic wet meadows on gleyic soils of the river floodplains and karstic poljes of the Apennine and Balkan Peninsulas

- *Trifolio-Hordeetalia* Horvatić 1960

MOL-06A *Molinio-Hordeion secalini* Horvatić 1934

Vegetation of wet meadows of the submediterranean precipitation-rich regions of the Balkans

mol14 The original diagnosis of the name in Horvatić (1934: 307) contains two associations, such as the 'Asocijacija *Trifolium fragiferum-Hordeum secalinum*', preferentially named '*Hordeetum secalini*' (p. 308) and the '*Peucedaneto-Molinietum littoralis*' (p. 321). To our knowledge, the name *Molinio-Hordeion* Horvatić 1934 has not been typified yet and therefore we select here the name *Trifolio fragiferi-Hordeetum secalini* Horvatić 1934 as the *lectotypus hoc loco*. (JPT, LM)

- *Alopecurion utriculati* Zeidler 1954 (29c)

mol15 Among other associations, Zeidler (1954: 293) classified in his *Alopecurion utriculati* the '*Hordeum secalinum-Trifolium fragiferum*-Assoziation (Horvatić 1934) emend.' with an unambiguous bibliographical reference to Horvatić (1934). We select here the *Trifolio fragiferi-Hordeetum secalini* Horvatić 1934 as the lectotype of the name *Alopecurion utriculati* Zeidler 1954 (*lectotypus hoc loco*; Horvatić (1934: 308). The *Trifolio fragiferi-Hordeetum secalini* Horvatić 1934 is the type of the earlier name *Molinio-Hordeion secalini* Horvatić 1934 (see Remark *mol14*), hence the name *Alopecurion utriculati* Zeidler 1934 is a homotypic synonym of the *Molinio-Hordeion secalini*. (LM, JPT)

- *Alopecurion rendlei* Zeidler 1954 *nom. mut. propos.* (*mut.superfl.*)

mol16 This form of the name was published by Julve (1993: 88) who failed to mention the original form of the name supposed to be mutated, namely the *Alopecurion utriculati* Zeidler 1954. The mutation appears superfluous however, as the *Alopecurion utriculati* is a homotypic synonym of the name *Molinio-Hordeion secalini* Horvatić 1934. (JPT)

MOL-06B *Trifolion resupinati* Micevski 1957

Vegetation of wet meadows of the subarid continental regions of the Southern Balkans

MOL-06C *Trifolio-Ranunculion pedati* Slavnić 1948

Vegetation of wet meadows of the subhumid continental regions of Northern Serbia

- *Trifolio-Ranunculion pedati* Slavnić 1942 (phantom)
- *Trifolio-Ranunculion pedati* Slavnić 1947 (phantom)

MOL-06D *Trifolion pallidi* Ilijanić 1969

Vegetation of wet meadows of the humid continental regions of the north-central Balkans

MOL-06E *Ranunculion velutini* Pedrotti 1978

Vegetation of wet meadows of the subhumid high-altitude karst poljes of the Central Apennines

MOL-07 *Holoschoenetalia* Br.-Bl. ex Tchou 1948

Humid grass-rush meadows of the Mediterranean

mol17 Delimitation of this vegetation towards the *Juncetea maritimi* is not clear and therefore it could be accommodated within the latter class. (EB) The communities of this order occur in freshwater-fed wetlands and therefore the classification within the *Juncetea maritimi* does not appear as warranted. However the current delimitation of the alliances within the *Holoschoenetalia* Br.-Bl. ex Tchou 1948 leaves a lot of latitude for improvement. (LM)

- *Holoschoenetalia* Br.-Bl. 1931 (2b)
- *Holoschoenetalia* Br.-Bl. in Br.-Bl. et al. 1947 (2b)

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- *Scirpoidetalia holoschoeni* Br.-Bl. ex Tchou 1948 *nom. mut. propos.* (45)

mol18 A proposal to mutate this name was published by Rivas-Martínez et al. (2011: 296). (LM)

- *Holoschoenetalia* Br.-Bl. ex Br.-Bl. et al. 1952 (31)
- *Phalaridetalia coerulescentis* Galán de Mera et al. 1997 (syntax.syn.)

MOL-07A *Molinio-Holoschoenion* Br.-Bl. ex Tchou 1948

Seasonally flooded meadows on subsaline soils of the Western Mediterranean

- *Holoschoenion* Br.-Bl. 1931 (2b)
- *Molinio-Holoschoenion* Br.-Bl. in Br.-Bl. 1947 (2b)
- *Molinio-Scirpoidion holoschoeni* Br.-Bl. ex Tchou 1948 *nom. mut. propos.* (45)

mol19 A proposal to mutate this name was published by Rivas-Martínez et al. (2011: 296). (LM)

- *Molinio-Holoschoenion* Br.-Bl. ex Br.-Bl. et al. 1952 (31)
- *Brizo minoris-Holoschoenion* Rivas Goday 1964 (syntax. syn.)
- *Agrostio stoloniferae-Scirpoidion holoschoeni* de Foucault 1984 (1)
- *Agrostio stoloniferae-Scirpoidion holoschoeni* de Foucault in de Foucault et Catteau 2012 (syntax.syn.)
- *Agrostion monteluccii* Biondi in Biondi et al. 2014 (syntax. syn.)

MOL-07B *Sieglingion decumbentis* Gamisans 1976

Relict oromediterranean oligotrophic silicicolous humid swards of Corsica

mol20 This alliance consists of a mixture of the *Nardetalia, Cynosurion* and *Caricetalia fuscae* elements – the alliance should therefore be rejected *as nomen dubium*. The local associations belong to the *Caricion fuscae*. (KD)

- *Danthonion decumbentis* Gamisans 1976 *nom. mut. propos.* (45)

mol21 The taxon name *Sieglingia decumbens* (L.) Bernh. has not been used in major European floras for the past 20 years and therefore the mutation of the name (using *Danthonia decumbens* (L.) DC.) appears appropriate. (LM)

MOL-07C *Dactylorhizo-Juncion striati* S. Brullo et Grillo 1978

Relict humid swards of high altitudes of Calabria and Sicily

MOL-07D *Deschampsion mediae* Br.-Bl. et al. 1952 *nom. conserv. propos.*

Humid meso-supramediterranean and submediterranean pastures on clayey soils of the Eastern Iberian Peninsula and Southern France

mol22 See Remark *mol21*. (LM)

- *Aphyllanthion* Br.-Bl. 1931 (2b)
- *Aphyllanthion* Br.-Bl. et Pawłowski 1931 *nom. ambig. rejic. propos.* (36)

mol23 The nomenclatural problem surrounding the name '*Aphyllanthion*' is intricate and has been handled in detail by Díez et al. (1998: 340–341) who documented that the type association of the *Aphyllanthion* (*Prunello hyssopifoliae-Deschampsietum mediae* Br.-Bl. et Pawłowski 1931) has been incorporated as early as in 1947 (Braun-Blanquet et al. 1947; see also Braun-Blanquet et al. 1952) into the *Deschampsion mediae* and remained linked to that name ever since. This *de facto* means that the valid name of the '*Deschampsion mediae* Br.-Bl., Roussine et Nègre 1952' should read '*Aphyllanthion* Br.-Bl. et Pawłowski 1931' which causes nomenclature instability resulting from wrong application of the name *Aphyllanthion* in the sense of its original diagnosis. Therefore Díez et al. (l.c.) as well as Rivas-Martínez et al. 2002a: 292) proposed to reject the name '*Aphyllanthion* Br.-Bl. et Pawłowski 1931' as *nomen ambiguum*. In the line also the name '*Aphyllanthion* Br.-Bl. in Br.-Bl., Roussine et Nègre 1952' should be rejected as *nomen ambiguum*. (LM)

- *Aphyllanthion* Br.-Bl. ex Br.-Bl. et al. 1952 *nom. ambig. rejic. propos.* (36)

mol24 Lectotypification of this name by Rivas-Martínez et al. (2011: 298) does not solve the nomenclatural conundrum since few lines below in the same publication the name '*Aphyllanthion* Br.-Bl. in Br.-Bl., Roussine et Nègre 1952' is suggested to be handled as *nomen ambiguum* according to the ICPN art. 36. (LM)

- *Deschampsio mediae-Molinion arundinaceae* (de Foucault 1984) Géhu 1999 (2b)
- *Aphyllanthion* Br.-Bl. et Pawłowski ex Rivas-Mart. et al. 2011 (36)
- *Deschampsio mediae-Molinion arundinaceae* de Foucault ex Delpech in Bardat et al. 2004 (3b)

MOL-07E *Gaudinio fragilis-Hordeion bulbosi* Galán de Mera et al. 1997

Humid meadows on sandy soils along the Western Mediterranean coasts

- *Gaudinio verticicolae-Hordeion bulbosi* Galán de Mera et al. 1997 *corr*. Rivas-Mart. et al. 2002 (*corr.superfl.*)

mol25 The suggested name correction (see Rivas-Martínez et al. 2002a: 236) is superfluous, and ICPN art. 43 does not apply since it is based only on more 'precise' identification of the eponymous taxon to variety (*Gaudinia fragilis* var. *verticicola*) while the species concept did not change. The Euro+Med PlantBase currently does not recognize *Gaudinia fragilis* var. *verticicola*. (LM)

MOL-07F *Brachypodio sylvatici-Holoschoenion romani* Gradstein et Smittenberg 1977

Riparian and spring-marsh wet grasslands at mid-altitudes of Crete

mol26 The *Caricetum creticae* (Gradstein & Smittenberg 1977: Table, 5, relevés 1–4) is the *holotypus* of the *Brachypodio sylvatici-Holoschoenion romani* Gradstein et Smittenberg 1977. (LM)

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GROUP OF ORDERS OF TALL-HERB MEADOWS FRINGES

MOL-08 *Filipendulo ulmariae-Lotetalia uliginosi* Passarge 1975

Tall-herb wet meadow fringe vegetation on mineral soils of temperate Europe

mol27 The original name published by Passarge (1975) reads 'Ordnung: *Filipendula-Lotus uliginosus*-Feuchtwiesensäume'; the protologue is thus listing eponymous taxa and the rank is also clearly indicated. The diagnosis also contains the validly published *Filipendulion* Segal ex Westhoff et Den Held 1969 – hence the order is validly published for a name published before 1.1.1979 (ICPN art. 14). This order, together with the *Convolvuletalia sepium (Epilobietea angustifolii)*, is sometimes placed within a class in its own right – the *Filipendulo-Convolvuletea* (see de Foucault 2011 and the literature cited therein). (JPT, LM)

- *Loto pedunculati-Filipenduletalia ulmariae* Passarge 1978 (29)
- *Filipenduletalia ulmariae* de Foucault et Géhu 1980 (2b, 2d, 3b)
- *Geranio sylvatici-Filipenduletalia ulmariae* Julve et Gillet in Julve 1993 (2b)
- *Lythro salicariae-Filipenduletalia ulmariae* Julve et Gillet in Julve 1993 (5)
- *Lythro salicariae-Filipenduletalia ulmariae* Julve et Gillet 1995 (2b, 5)

MOL-08A *Filipendulo-Petasition* Br.-Bl. ex Duvigneaud 1949

Tall-herb fringe wet meadow vegetation on neutral and slightly basic mineral soils in the submontane and montane belts of Western and Central Europe

mol28 Floristic differences between this alliance and the *Calthion palustris* are small and therefore both alliances should be merged. (MC) These tall-forb communities, forming successional stages of abandoned wet grasslands, along ditches and forest-edge are structurally and ecologically so different from the managed grasslands of the *Molinio-Arrhenatheretea* that they should be classified within the *Filipendulo ulmariae-Lotetalia uliginosi* and, together with the *Petasito-Chaerophylletalia* and the *Convolvuletalia sepium,* placed within a separate class of natural and semi-natural tall-forb communities of moist to wet habitats – the *Filipendulo ulmariae-Convolvuletea sepium*. Yet, currently there seems to be no valid name available for this class concept. (JD, JPT)

- *Filipendulo-Cirsion oleracei* Duvigneaud 1946 (2b)
- *Filipendulo-Petasition* Br.-Bl. 1949 *nom. ambig. rejic. propos.* (3f, *rejic.superfl.*)

mol29 A proposal to reject this name as a *nomen ambiguum* was published by Ellmauer & Mucina (1993: 324; see also Theurillat 1997). This proposal is obviously superfluous as the name is invalid. (LM)

- *Filipendulo-Petasition* Br.-Bl. 1950 (2b)
- *Angelico sylvestris-Filipendulion ulmariae* Passarge 1977
- *Filipendulo ulmariae-Cirsion rivularis* de Foucault 1984 (1)
- *Cirsio palustris-Filipendulion ulmariae* Klauck 1993
- *Chaerophyllo hirsuti-Filipendulion ulmariae* (Passarge 1977) Preising in Preising et al. 1997
- *Filipendulo ulmariae-Chaerophyllion hirsuti* de Foucault 2011 (syntax.syn.)

MOL-08B *Rumicion balcanici* Lakušić ex D. Lakušić et al. 2015

Tall-herb fringe wet meadow vegetation on neutral and slightly basic mineral soils in the submontane and montane belts of the Central Balkans

- *Rumicion balcanici* Lakušić 1965 (1)
- *Rumicion balcanici* Lakušić 1968 (phantom)
- *Rumicion balcanici* Lakušić 1973 (2b)
- *Rumicion balcanici* Lakušić in Blečić et Lakušić 1976 (2b)
- *Cicerbition pancicii* Lakušić 1978 (phantom; *mut.superfl.*)
- *Mulgedion pancicii* Lakušić 1978 (phantom)
- *Rumicion balcanici* Lakušić in Zupančič et al. 1986 (2b)
- *Ranunculion serbici* Lakušić et al. 1987 (2b)
- *Mulgedion pancicii* Lakušić in Lakušić et Redžić 1988 (5)
- *Cicerbition pancicii* Lakušić in Lakušić & Redžić ex D. Lakušić et al. 2015 (syntax.syn.)
- *Ranunculion serbici* Lakušić et al. ex D. Lakušić et al. 2015 (syntax.syn.)

MOL-08C *Veronico longifoliae-Lysimachion vulgaris* (Passarge 1977) Bal.-Tul. 1981

Tall-herb fringe wet meadow vegetation on neutral and slightly basic mineral soils in the lowland and colline belts of temperate Europe

- *Thalictro flavi-Filipendulion ulmariae* de Foucault 1984 (1)
- *Stachyo palustris-Cirsion oleracei* Julve et Gillet in Julve 1993 (5)
- *Stachyo palustris-Cirsion oleracei* Julve et Gillet 1994 (2b, 5)
- *Thalictro flavi-Filipendulion ulmariae* de Foucault in Royer et al. 2006 (syntax.syn.)

MOL-08D *Filipendulion ulmariae* Segal ex Westhoff et Den Held 1969

Tall-herb fringe wet meadow vegetation on acidic mineral soil of temperate Europe

- *Filipendulion ulmariae* Segal 1966 (2b)
- *Filipendulion ulmariae* Segal ex Lohmeyer in Oberd. et al. 1967 (2b)
- *Lotion uliginosi* Passarge 1975 (2b)
- *Oenanthion crocatae* de Foucault 1988 (syntax.syn.)
- *Violo palustris-Lotion uliginosi* Passarge 1989 (8)
- *Achilleo ptarmicae-Cirsion palustris* Julve et Gillet in Julve 1993 (5)
- *Achilleo ptarmicae-Cirsion palustris* Julve et Gillet 1994 (2b, 5)
- *Achilleo ptarmicae-Cirsion palustris* Julve et Gillet ex de Foucault 2011 (syntax.syn.)

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MOL-08E *Mentho longifoliae-Juncion inflexi* T. Müller et Görs ex de Foucault 2009

Tall-herb temporarily flooded lightly-grazed nutrient-rich meadow fringes in riparian and alluvial habitats of temperate Europe

- *Mentho longifoliae-Juncion inflexi* T. Müller et Görs 1969 (2b)
- *Juncion inflexi* Knapp 1971 (orig.form) (corresp.; as suballiance) (2b)
- *Juncion inflexi* (Knapp 1971) Mucina 1991 (2b)
- *Mentho aquaticae-Juncion inflexi* Julve 1993 (2b)
- *Mentho suaveolentis-Juncion longicornis* Julve 1993 (3b)
- *Scorpidio holoschoeni-Juncion inflexi* de Foucault in de Foucault et Catteau 2012 (syntax.syn.)

MOL-09 *Althaeetalia officinalis* Golub et Mirkin in Golub 1995

Tall-herb periodically flooded meadows of the steppe and semi-desert zones of Eastern Europe

mol30 The syntaxonomic identity of this order is doubtful. Description and diagnostic species suggest that this order can be largely identified with the C*onvolvuletalia sepium* (*Epilobietea angustifolii*) and perhaps to a lesser extent with the *Filipendulo-Petasition* (*Molinio-Arrhenatheretea*). (JD, KD, LM)

- *Althetalia officinalis* Golub et Mirkin 1986 (orig.form) (2b)
- *Althetalia officinalis* Golub et Mirkin in Golub 1995 (orig.form)

MOL-09A *Althaeion officinalis* Golub et Mirkin in Golub 1995

Tall-herb periodically flooded meadows in the steppe zone of the Lower Volga River valley

- *Althion officinalis* Golub et Mirkin 1986 (orig.form) (5)
- *Althion officinalis* Golub et Mirkin in Golub 1995 (orig. form)

MOL-09B *Euphorbion palustris* Ageleulov et Golub in Golub 1995

Tall-herb periodically flooded meadows in the steppe zone of the Ural River valley

MOL-09C *Lythro-Euphorbion* Mirkin et Naumova 1986

Tall-herb periodically flooded alluvial meadows in the semi-desert zone of European Russia

ORDER OF ZOO-ANTHROPOGENIC WET MEADOWS

MOL-10 *Potentillo-Polygonetalia avicularis* Tx. 1947

Temporarily flooded and heavily grazed zoo-anthropogenic nutrient-rich meadows and pastures of the temperate and mediterranean regions of Europe

mol31 In some national vegetation systems, this syntaxonomic concept is more or less identical with the class in its own right – the *Agrostietea stoloniferae* (Oberdorfer 1983; de Foucault & Catteau 2012). (LM)

- *Potentilletalia* Anserinae Oberd. 1949 (orig.form) (2b)
- *Plantaginetalia majoris* Tx. (1947) 1950 (2b)
- *Festucetalia arundinaceae* Doing 1963 (2b)
- *Agrostietalia stoloniferae* Oberd. in Oberd. et al. 1967 (2b)
- *Agrostietalia stoloniferae* T. Müller et Görs in Görs 1968 (syntax.syn.)
- *Agrostietalia stoloniferae* T. Müller et Görs 1969 (phantom)
- *Trifolio fragiferae-Agrostietalia stoloniferae* (Oberd. in Oberd. et al. 1967) Tx. 1970 (2b)
- *Galio palustris-Poetalia palustris* V. Solomakha 1996

MOL-10A *Potentillion anserinae* Tx. 1947

Temporarily flooded and heavily grazed nutrient-rich pastures experiencing variable wet-dry or brackish-fresh alternating conditions of temperate Europe

- *Lolio-Potentillion anserinae* Tx. 1947
- *Potentillion anserinae* von Rochow 1948 (31)
- *Agrostion stoloniferae* Görs 1966 (31)
- *Eu-Agropyro-Rumicion* Westhoff et Den Held 1969 (2b, 34b)
- *Juncion effusi* Van Leeuwen et Westhoff in Doing 1963 (2b)
- *Blysmo-Juncion compressi* Knapp 1971 (orig.form) (corresp.; as suballiance)
- *Poion palustris* Shelyag-Sosonko et al. 1985 (1)
- *Poion palustris* Shelyag-Sosonko et al. 1986
- *Ranunculo sardoi-Plantaginion intermediae* Julve 1993 (5)
- *Festucion arundinaceae* Duvigneaud in Géhu 1999 (2b, 5)

MOL-10B *Loto tenuis-Trifolion fragiferi* Westhoff et Den Held ex de Foucault 2009

Temporarily flooded heavily grazed nutrient-rich grasslands and herblands on subsaline soils of temperate Europe

- *Loto tenuis-Trifolion fragiferi* Westhoff et al. 1962 (2b)
- *Loto tenuis-Trifolion fragiferi* Westhoff et Den Held 1969 (2b)
- *Junco gerardi-Bromion racemosi* de Foucault in de Foucault et Catteau 2012 (syntax.syn.)

MOL-10C *Trifolion maritimi* Br.-Bl. ex Br.-Bl. et al. 1952

Temporarily flooded heavily grazed nutrient-rich grasslands and herblands on subsaline soils of the Mediterranean

mol32 This name (originally coined by J. Braun-Blanquet 1931) has been neglected for a long time despite having been validated by Braun-Blanquet et al. (1952: 121) since the protologue contains one validly described association – the '*Agropyreto-Trifolietum maritimi* Br.-Bl. 1931' (validly published in Braun-Blanquet et al. 1952: see the synoptic table therein). (LM)

- *Trifolion maritimi* Br.-Bl. 1931 (2b)
- *Trifolio fragiferi-Cynodontion* Br.-Bl. et O. de Bolòs 1958 (syntax.syn.)

mol33 The original description suggests that this alliance belongs to the *Juncetea maritimi*. (JD)

- *Trifolion squamosi* Julve 1993 (2b)

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VEGETATION OF THE NEMORAL OROSYSTEMS

SAB *Junipero-Pinetea sylvestris* Rivas-Mart. 1965 *nom. invers. propos.*

Relict oromediterranean and submediterranean orotemperate dry pine forests, juniper woods and related scrub of the Mediterranean

sab01 This proposal was suggested in Rivas-Martínez et al. (2002a), following the ICPN art. 10b. Although not approved by the Nomenclatural Commission yet, we prefer to use the inverted form as it is clear that *Pinus sylvestris* is the dominating element; nowadays the concept of this class is used for woodland communities. The addition of the specific epithet '*sabina*' is, however, prohibited because there are two species of *Juniperus* occur in the original diagnosis *(J. sabina, J. nana)* and hence ICPN art. 40a applies. (LM, JPT)

- *Pino-Juniperetea* Rivas-Mart. 1965 (42)

sab02 Unlike some authors (e.g. Stanisci 1997; Brullo et al. 2001b) we limit the applicability of this concept only to the mediterranean orographic systems and consider structurally similar vegetation types (dominated by various *Pinus* and *Juniperus* species occurring at high altitudes of the nemoral mountain ranges (incl. Alps, Apennines, Carpathians and Dinarides) as belonging to other classes such as the *Erico-Pinetea, Pyrolo-Pinetea* and *Cetrario-Loiseleurietea* (*Juniperus nana* low scrub). (LM) The overall differentiation between the *Junipero-Pinetea* and the *Pyrolo-Pinetea* is weak. The geographic distinction might be used more usefully at a lower syntaxonomic level. (KD)

- *Junipero sabinae-Pinetea ibericae* Rivas-Mart. 1965 *nom. mut. propos.* et *nom. invers. propos.* (Rec.10C, *mut.superfl.*)

sab03 This suggestion to 'correct' *(recte:* 'mutate') the name, published by Rivas-Martínez et al. (2011: 474), is based on replacement of considering *P. sylvestris* var. *iberica* Svoboda as the eponymous taxon. We consider this suggestion superfluous since the current taxonomy does not ascribe any notable status to this taxon. (LM)

SAB-01 *Junipero-Pinetalia sylvestris* Rivas-Mart. 1965 *nom. invers. propos.*

Relict supramediterranean and submediterranean orotemperate dry pine and juniper woods of the Iberian Peninsula

sab04 See Remark *sab01*. (LM)

- *Pino-Juniperetalia sabinae* Rivas-Mart. 1965 (42)
- *Junipero sabinae-Pinetalia ibericae* Rivas-Mart. 1965 *nom. corr. propos. et nom. invers. propos.* (*sensu* Rivas-Martínez et al. 2011) (*corr.superfl., invers.illeg.*)
- *Junipero hemisphaericae-Pinetalia sylvestris* Rameau 1996 (1)
- *Junipero hemisphaericae-Pinetalia sylvestris* Rameau 1998 (29)

SAB-01A *Junipero-Pinion sylvestris* Rivas Goday in Rivas Goday et Borja 1961 *nom. invers. propos.*

Calcicolous supra-oromediterranean oroiberian and submediterranean montane pine forests

sab05 The inversion of the original name *'Pino-Juniperion sabinae'* was suggested in Rivas-Martínez et al. (2002a), following the ICPN art. 10b. Although not approved by the Nomenclatural Commission yet, we prefer to use the inverted form. The epithet *'sylvestris'* is added according to ICPN Rec. 10C. (LM, JPT)

- *Pino-Juniperion sabinae* Rivas Goday in Rivas Goday et Borja 1961 (42)
- *Juniperion sabinae-Pinion sylvestris* Rivas Goday in Rivas Goday et Borja 1961 *nom. invers. propos.* (Rec.10C, *invers. superfl.*)
- *Pino ibericae-Juniperion sabinae* Rivas Goday in Rivas Goday et Borja 1961 *corr.* Rivas-Mart. et J.A. Molina in Rivas-Mart. et al. 1999 (*corr.superfl.*)

SAB-01B *Juniperion thuriferae* Rivas-Mart. 1969

Calcicolous meso-supramediterranean oroiberian and submediterranean montane juniper woodlands

SAB-01C *Junipero hemisphaericae-Pinion sylvestris* Rivas-Mart. 1983

Pyreneo-Catalonian montane and subalpine mesophilous pine forests

- *Junipero hemisphaericae-Pinion pyrenaicae* Rivas-Mart. 1983 *corr.* Rivas-Mart. et al. 2011 (*corr.superfl.*)
- *Junipero intermediae-Pinion catalaunicae* Rivas-Mart. 1983 *corr.* Rivas-Mart. et J.A. Molina in Rivas-Mart. et al. 1999 (*corr.superfl.*)

SAB-01D *Avenello ibericae-Pinion ibericae* Rivas-Mart. et J.A. Molina in Rivas-Mart. et al. 1999

Supramediterranean and submediterranean montane dry pine forests of the Central Iberian and Cantabrian mountains

SAB-02 *Juniperetalia hemisphaericae* Rivas-Mart. et J.A. Molina in Rivas-Mart. et al. 1999

Relict submediterranean and supra-mediterranean dry scrub of Western Mediterranean

sab06 This syntaxonomic concept could be considered as a class in its own right as based on the same principle as much as the *Rhamno-Prunetea* should be considered different from the *Carpino-Fagetea* and the *Cetrario-Loiseleurietea* from the *Vaccinio-Piceetea*. (LM)

SAB-02A *Cytision oromediterranei* Tx. in Tx. et Oberd. 1958 *corr.* Rivas-Mart. 1987

Silicicolous orotemperate, mainly submediterranean dry juniper scrub of the Central Iberian and Cantabrian mountains

sab07 For the arguments underpinning this name correction see Rivas-Martínez et al. (2011: 474). (LM)

- *Nano-Juniperion* Rothmaler 1954 (2b)

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- *Genistion purgantis* Tx. 1954 (phantom)
- *Genistion purgantis* Tx. in Tx. et Oberd. 1958 (43)
- *Cytision purgantis* Tx. in Tx. et Oberd. 1958 *nom. mut. propos.* (45)
- *Pino-Cytision purgantis* Rivas-Mart. 1964 (29)
- *Junipero-Cytision purgantis* Br.-Bl. et al. 1964 (syntax. syn.)
- *Pino-Cytision oromediterranei* Rivas-Mart. 1964 *corr*. Rivas-Mart. et al. 1987 (43)
- *Cytiso oromediterranei-Pinion* Rivas-Mart. 1964 *corr*. Rivas-Mart. et al. 1987 *nom. invers. propos.* (42)

SAB-02B *Genisto versicoloris-Juniperion hemisphaericae* Rivas-Mart. et J.A. Molina in Rivas-Mart. et al. 1999

Silicicolous oromediterranean dry juniper scrub of the Sierra Nevada (Southern Iberian Peninsula)

SAB-02C *Pruno prostratae-Juniperion sabinae* Rivas-Mart. et J.A. Molina in Rivas-Mart. et al. 1999

Calcicolous supra-oromediterranean and supra-orotemperate submediterranean dry juniper scrub of the Central Iberian and Cantabrian mountains

SAB-03 *Berberido creticae-Juniperetalia excelsae* Mucina *ordo nov. hoc loco*

Relict submediterranean supramediterranean dry pine forests and juniper woods of the Central and Eastern Mediterranean

sab08 This new order (*Berberido creticae-Juniperetalia excelsae*) is the Central and Eastern Mediterranean geographic analogue of the Western Mediterranean *Pino sylvestris-Juniperetalia sabinae* Rivas-Mart. 1965. It comprises a series of open-woodland alliances with sparse scrub undergrowth, distributed from the Tyrrhenian islands of Corsica and Sardinia as far east as Cyprus and Middle East. The *Juniperion excelso-foetidissimae* (Matevski et al. 2010: 162) is the *holotypus (hoc loco)* of the order. *Berberis aetnensis, Juniperus excelsa, J. foetidissima, Lactuca cyprica* and *Pinus nigra* subsp. *laricio* are the character taxa of the order. (LM)

SAB-03A *Berberido aetnensis-Pinion laricionis* (S. Brullo et al. 2001) Mucina et Theurillat *nom. nov. hoc loco*

Acidophilous dry pine forests in the supra-mediterranean belt of Corsica, Sardinia, Sicily and Calabria

sab09 The introduction of the *nomen novum* appears necessary in order to introduce a valid name for this syntaxonomic concept since the available name '*Berberidion aetnensis* S. Brullo et al. 2001' is illegitimate (ICPN art. 29). The *nomen novum* is introduced for the '*Berberidion aetnensis* S. Brullo et al. 2001' (see Remark *sab10*). (LM, JPT)

- *Pinion laricionis* Mayer 1984 (phantom)
- *Pinion nigrae-laricionis* Mayer 1984 (2b)
- *Pinion calabricae* S. Brullo et Spampinato 1999 (1)
- *Berberidion aetnensis* S. Brullo et al. 2001 (29b)

sab10 The name is illegitimate (ICPN art. 29b) because, although the alliance comprises both coniferous forests and dwarf shrublands, the type association (*Junipero nanae-Pinetum laricionis*) is tree-dominated. (LM, JPT)

- *Pinion calabricae* S. Brullo et Spampinato in S. Brullo et al. 2001 (3b)

SAB-03B *Juniperion excelso-foetidissimae* Em ex Matevski et al. 2010

Submediterranean montane tall juniper woods on shallow soils over limestone, schist and ultramafic substrates of the south-central Balkans and the Hellenic mainland

- *Juniperion excelso-foetidissimae* Em in Jovanović et al. 1989 (2b)

SAB-03C *Jasmino-Juniperion excelsae* Didukh, Vakarenko et Shelyag-Sosonko ex Didukh 1996

Crimean submediterranean montane open dry juniper woods

sab11 Didukh (1996) classified this alliance within the *Quercetea pubescentis*. However, the synoptic table in the latter paper (Table 1 on pages 68–71) does not support his conclusion. The *Jasmino-Juniperion excelsae* are relict woods showing strong mediterranean influence. (LM)

- *Junipero-Quercion* Jakucs 1959 (phantom)
- *Junipero excelsae-Quercion pubescentis* Jakucs 1960 (2b)
- *Jasmino-Juniperion excelsae* Didukh, Vakarenko et Shelyag-Sosonko 1986 (2b)

SAB-03D *Berberido creticae-Juniperion foetidissimae* S. Brullo et al. 2001

Silicicolous montane pine and juniper woods and related scrub of continental Hellas, Cyprus, Anatolia and Lebanon

sab12 Brullo et al. (2001b) included here those coniferous forests considered as an eastern geographic analogon of the '*Berberidion aetnensis*' (*recte*: *Berberido aetnensis-Pinion laricionis*, see above). Although most of the relevés in the diagnosis of the type association (*Sorbo orbiculatae-Juniperetum foetidissimae* Barbero et Quézel ex S. Brullo et al. 2001) are dominated by *Pinus nigra* subsp. *pallasiana* (cover category 4 or 5 in the Braun-Blanquet sampling scale), the name can nevertheless be considered as validly published because its type relevé is dominated more by *Juniperus foetidissima* and *Sorbus umbellata* var. *orbiculata* (both cover category 4) rather than by *Pinus nigra* subsp. *pallasiana* (cover category 2). (JPT)

- *Junipero-Daphnion* Dafis 1973 (2b)
- *Cephalorrhyncho cyprici-Pinion pallasianae* Barbero et Quézel 1979 (5)

ERI *Erico-Pinetea* Horvat 1959

Relict pine forests and related scrub on calcareous and ultramafic substrates of the Balkans, the Alps, the Carpathians and Crimea

- *Erico-Pinetea nigrae* Horvat ex Passarge 1968 (2b)
- *Erico-Pinetea* Ellenberg et Klötzli 1974 (3b)
- *Epipactido atrorubentis-Pinetea sylvestris* Rameau 1994 (1)

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ERI-01 ***Erico-Pinetalia*** **Horvat 1959** ***nom. conserv. propos.***

Montane calcareous relict pine forests of the Balkans, the Apennines, the Alps and Carpathians

eri01 The formal conservation of this name was proposed in Willner & Grabherr (2007: 235). (LM)

- *Carici-Pinetalia sylvestris* Passarge 1968 (syntax.syn.)
- *Carici-Pinetalia sylvestris* Passarge in Passarge et G. Hofmann 1968 (31)
- *Pinetalia balcanica* Lakušić 1972 (34a)
- *Pinetalia heldreichii-nigrae* Lakušić 1972 (1)
- *Pinetalia heldreichii-nigrae* Lakušić 1973 (2b)
- *Erico-Pinetalia nigrae* Passarge 1978 (2b, 3b)
- *Monotropo hypopitys-Pinetalia* Rameau 1981 (3b)
- *Pinetalia heldreichii-nigrae* Lakušić et Redžić 1988 (2b, 5)
- *Buxo-Pinetalia* Rameau 1996 (1)
- *Buxo sempervirentis-Pinetalia sylvestris* Rameau 1998 (syntax.syn.)
- *Epipactido muelleri-Pinetalia sylvestris* Royer 2011 (5)

eri02 This order was described by Royer (2011) to distinguish the secondary calcicolous pine forests from those found in natural habitats. This separation however, is not supported by floristic composition of the communities this author presented. Besides, the name *Epipactido muelleri-Pinetalia sylvestris* remains invalidly published as the Royer failed to designate the type *expressis verbis.* (LM, JPT)

- *Monotropo hypopitys-Pinetalia* Rameau in Royer 2011 (2b)

ALPIC-CARPATHIAN-HERCYNIAN GROUP OF ALLIANCES

ERI-01A ***Erico carneae-Pinion*** **Br.-Bl. in Br.-Bl. et al. 1939** ***nom. invers. propos.***

Relict Pinus sylvestris forests on calcareous substrates of the Alps, the Hercynicum and the Massif Central

eri03 The inversion of the name was proposed in Willner & Grabherr (2007: 235; see also Šilc & Čarni 2012: 158). (LM)

- *Pino-Ericion carneae* Br.-Bl. in Br.-Bl. et al. 1939 (orig. form)
- *Pinion salzmanni* Br.-Bl. 1931 (2b)
- *Pinion sylvestris calcicolum* Aichinger 1933 (34a)
- *Chamaebuxo-Pinion* Wendelberger 1962 (phantom)
- *Cephalanthero rubrae-Pinion sylvestris* Vanden Bergen 1963 (syntax.syn.)
- *Chamaebuxo-Pinion* Wendelberger 1963 (2b)
- *Carici-Pinion sylvestris* G. Hofmann in Passarge 1968 (syntax.syn.)
- *Epipactido-Pinion sylvestris* Passarge 1968 (Regionalverband) (3d)
- *Molinio-Pinion* Ellenberg et Klötzli 1972 (phantom)
- *Molinio-Pinion* Ellenberg et Klötzli 1974 (3b)
- *Seslerio-Piceion* Passarge 1978 (2b, 3b)
- *Molinio-Pinion* Ellenberg et Klötzli ex Theurillat in Theurillat et Béguin 1985 (syntax.syn.)
- *Monotropo hypopitys-Pinion sylvestris* Rameau 1996 (1)
- *Epipactido muelleri-Pinion sylvestris* Royer in Royer et al. 2006 (syntax.syn.)
- *Monotropo hypopitys-Pinion sylvestris* Royer in Royer 2011 (2b)

ERI-01B ***Pulsatillo slavicae-Pinion*** **Fajmonová 1978**

Relict Pinus sylvestris forests on calcareous substrates of the Western Carpathians

BALKAN & AMPHIADRIATIC GROUP OF ALLIANCES

ERI-01C ***Seslerio rigidae-Pinion*** **Coldea ex Mucina et Čarni** ***all. nov. hoc loco***

Relict Pinus sylvestris forests on calcareous substrates of the Eastern and Southern Carpathians and the Central and Eastern Dinarides

eri04 This alliance is the Central and Eastern Balkans geographic analogon of the *Erico-Pinion* and the *Pulsatillo slavicae-Pinion*. We select the *Seslerio rigidae-Pinetum sylvestris* Coldea 1992 (Coldea 1992) as the *holotypus (hoc loco)* of the new alliance. The diagnostic taxa of the *Seslerio rigidae-Pinion sylvestris* are: *Euphrasia dinarica, Gentianella crispata, Juniperus sabina, Pinus sylvestris, Rhamnus saxatilis subsp. tinctorius, Scabiosa portae, Sesleria rigida, Sorbus dacica, Stachys officinalis* subsp. *serotina, Thymus praecox* subsp. *polytrichus* and *Trifolium pignantii*. (LM, AC)

- *Pinion sylvestris* Lakušić 1972 (2b)
- *Pinon silvestris* Lakušić in Lakušić et Redžić 1989 (orig.form) (31)
- *Seslerio rigidae-Pinion* Coldea 1992 (5)

ERI-01D ***Erico carneae-Piceion omorikae*** **Mucina et Čarni** ***all. nov. hoc loco***

Relict Picea omorika forests on calcareous substrates of the Central and Southern Balkans

eri05 The relict Bosnian *Picea omorika* forests have been classified as an alliance in its own right by several authors (Lakušić 1975; Tomić & Rakonjac 2011). Although the *'Piceion omoricae'* is a phantom name, the vegetation of this syntaxonomic concept (*'Piceetum omoricae';* Tregubov 1941) contains dominant relict elements and the *Erico-Pinetea* species. Here we designated the *Piceetum omorikae* Tregubov 1941 (Tregubov 1941: Table on pages 16 and 17) as the *holotypus (hoc loco)* of the alliance. *Picea omorika, Calamagrostis varia* and *Erica carnea* are the diagnostic species of the new alliance. (LM, AC)

- *Piceion omoricae* Tregubov 1941 (phantom)
- *Piceion omoricae* Lakušić 1975 (orig.form) (2b)
- *Piceion omorikae* Lakušić 1977 (phantom)
- *Piceion omorikae* Tomić et Rakonjac 2011 (2b, 5)

ERI-01E ***Fraxino orni-Pinion nigrae*** **Em 1978**

Relic Pinus nigra forests on calcareous substrates of the Central and Southern Balkans

- *Pinion austroillyricum* P. Fukarek 1969 (2b)
- *Pinion nigrae* Lakušić 1972 (2b)

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- *Pinion nigrae* Lakušić 1976 (phantom)
- *Orno-Pinion* Em 1978 (orig.form)
- *Fraxino orni-Pinion pallasianae* Em 1978 *corr.* Milosavljević et al. 2008 (*corr.superfl.*)

ERI-01F *Erico-Fraxinion orni* Horvat 1959 *nom. invers. propos.*

Relict Pinus nigra forests on dolomite and ultramafic substrates of the Dinarides

eri06 The proposed inversion follows from application of ICPN art. 10b. (JD)

- *Fraxino orni-Ericion* Horvat 1959 (orig.form) (42)
- *Orno-Ericion dolomiticum* Horvat 1959 (orig.form) (34a)
- *Orno-Ericion serpentinicum* Horvat 1959 (orig.form) (34a)
- *Pinion austriacae* Horvat 1959 (*sensu* Redžić 2011) (phantom)
- *Fraxino orni-Quercion dalechampii* (Horvat 1963) Tomić 2004 (phantom)
- *Fraxino orni-Quercion dalechampii* (Horvat 1963) Tomić in Tomić et al. 2006 (5)
- *Fraxino orni-Pinion nigrae-sylvestris* (Ht. 1953) Zupančič 2007 (orig.form) (29a)

ERI-01G *Chamaecytiso hirsuti-Pinion pallasianae* Barbero et Quézel 1976 *nom. invers. propos.*

Relict Pinus nigra forests on calcareous, dolomitic and ophiolithic rocky slopes of the Southern Balkans

- *Pino-Chamaecytision* Barbero et Quézel 1976 (orig.form) (42)

ERI-01H *Pinion heldreichii* Horvat 1946

Relic Pinus heldreichii forests on calcareous and ultramafic substrates of the Southern Balkans and Southern Apennines

- *Pinion leucodermidis* Horvat 1946 *nom. mut. propos.* (45)

ERI-02 *Pinetalia pallasianae-kochianae* Korzhenevsky 1998

Relict Pinus sylvestris forests on calcareous substrates of southeastern Ukraine and Crimea

- *Teucrio-Pinetalia* Didukh 2003 (syntax.syn.)

ERI-02A *Pinion pallasianae* Korzhenevsky 1998

Relict Pinus sylvestris forests on Jurassic limestones of Southern Crimea

- *Pinion pallasianae* Golubiev et Korzhenevskii 1984 (1)
- *Pinion kochianae* Korzhenevsky 1986 (5)
- *Carici humilis-Pinion kochianae* Didukh 2001 (phantom)
- *Brachypodio rupestris-Pinion pallasianae* Didukh 2003 (syntax.syn.)
- *Carici humilis-Pinion kochianae* Didukh 2003 (syntax.syn.)

ERI-02B *Libanotido intermediae-Pinion sylvestris* Didukh 2003

Relict Pinus sylvestris forests on Cretaceous marls in steep river valleys of southeastern Ukraine

MUG *Roso pendulinae-Pinetea mugo* Theurillat in Theurillat et al. 1995

Pine krummholz in the subalpine belts of the nemoral mountain ranges of Europe

mug01 In order to accommodate krummholz scrub dominated by *Pinus mugo* (typical of the subalpine belt of the central and south European nemoral mountain ranges) and motivated by the structural differences between the krummholz scrub and boreal forests, Theurillat et al. (1995: 228) described the *Roso pendulinae-Pinetea mugo* (containing the *Junipero-Pinetalia mugo* Boşcaiu 1971). (LM) The *Roso-Pinetea* has been recently accepted also for the Carpathian (Šibík et al. 2005, 2008) and the Balkan (Redžić 2007) vegetation. (JPT, LM) An alternative suggestion is to accommodate this syntaxonomic content of this unit within the *Loiseleurio-Vaccinietea*. (NE)

- *Mugo-Alnetea viridis* Eggler 1952 p.p. (orig.form) (2b)
- *Pino mugo-Alnetea alnobetulae* Eggler ex Julve 1993 p.p. (8)

MUG-01 *Junipero-Pinetalia mugo* Boşcaiu 1971

Pine krummholz in the subalpine belts of the nemoral mountain ranges of Europe

- *Pinetalia mughi* Rübel 1933 (orig.form) (2b)
- *Mugo-Alnetalia viridis* (Br.-Bl. 1918) Eggler 1952 (orig. form) (2b)
- *Pinetalia mugi* Lakušić et al. 1979 (orig.form) (2b)
- *Rhododendro-Pinetalia mugi* Puşcaru-Soroceanu et al. 1981 (orig.form) (29c)
- *Pinetalia mugi* Lakušić 1982 (orig.form) (2b)

SILICICOLOUS ALLIANCE

MUG-01A *Pinion mugo* Pawłowski et al. 1928

Subalpine silicicolous pine krummholz of the Alps, the Carpathians and the Balkans

- *Pinion montanae* Pawłowski et al. 1928 *nom. mut. propos.* (*mut.superfl.*)
- *Pinion montanae mughi* Aichinger 1933 p.p. (orig.form) (31, 41b)
- *Pinion mughi prostratae* Rübel 1933 (orig.form) (2b)
- *Juniperion nanae* P. Fukarek 1969 (2b)
- *Pinion mughi* Lakušić et al. 1978 (orig.form) (2b)
- *Vaccinio-Mugion* (Pawłowski et al.1928) Passarge 1978 (orig.form) (29b)
- *Athyrio alpestris-Pinion mughi* Jirásek 1996 (orig.form) (syntax.syn.b)
- *Pinion mugo illyricum* Redžić et al. 2011 (2b, 5)

CALCICOLOUS GROUP OF ALLIANCES

MUG-01B *Erico-Pinion mugo* Leibundgut 1948

Subalpine calcicolous pine krummholz of the Central and Eastern Alps and the Carpathians

- *Mugeto-Ericion* Leibundgut 1948 (orig.form)

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mug02 According to the original diagnosis, the type association of the '*Mugeto-Ericion*' is the '*Mugo-Ericetum* Br.-Bl. 1939' (*Erico-Pinetum mugo nom. invers. propos.*). Besides the type, the alliance comprises also the '*Mugo-Rhodoretum hirsuti* Br.-Bl. 1939' (*Rhododendro hirsuti-Pinetum mugo*). Both associations are considered to be forests ('Erika-Bergföhrenwald, Alpenrosen-Bergföhrenwald' in German), although in their original diagnosis these associations include, as different subassociations, both wood formations with *P. mugo* var. *arborea,* and scrubland formations with *P. mugo* var. *prostrata*. In their present concept, these two associations are still considered mainly as forests (e.g. Ellenberg & Klötzli 1974). (JPT)

- *Pinion montanae mughi* Aichinger 1933 p.p. (orig.form) (31b)
- *Erico-Mugion* Passarge 1978 (orig.form) (2b)
- *Rhododendro hirsuti-Pinion mugo* Rivas-Mart. et al. 1991 (syntax.syn.)

mug03 The type association of the *Rhododendro hirsuti-Pinion mugo* Rivas-Mart. et al. 1991 is the *Pino mugo-Rhododendretum hirsuti* Br.-Bl. in Br.-Bl. et al. 1939. This unit is a forest association ('Alpenrosen-Bergföhrenwald' in German), although in its original diagnosis the associations includes, as different subassociations, both woods with *P. mugo* var. *arborea* as well as shrublands with *P. mugo* var. *prostrata* (subass. *cladonietosum*). (JPT)

MUG-01C *Epipactido atropurpureae-Pinion mugo* Stanisci 1997

Subalpine calcicolous pine krummholz of the Central Apennines and the Southern Alps

MUG-01D *Lonicero borbasianae-Pinion mugo* Čarni et Mucina 2015

Subalpine calcicolous pine krummholz of the Balkan Peninsula

- *Pinion montanae* P. Fukarek et Fabijanić 1968 (3b)

RHO *Rhododendro hirsuti-Ericetea carneae* Schubert et al. 2001

Supramontane to subalpine low heath on calcareous skeletal soils, rocky outcrops, lapiés and boulders of the Alps, the Apennines and the Dinarides

RHO-01 *Rhododendro hirsuti-Ericetalia carneae* Grabherr et al. 1993

Supramontane to subalpine low heath on calcareous skeletal soils, rocky outcrops, lapiés and boulders of the Alps, the Apennines and the Dinarides

- *Daphno-Rhodoretalia hirsuti* Lakušić et al. 1978 (orig.form) (phantom)
- *Daphno-Rhodoretalia hirsuti* Lakušić et al. 1979 (orig.form) (2b, 5)

RHO-01A *Ericion carneae* Rübel ex Grabherr et al. 1993

Subalpine and alpine low heath on rocky calcareous soils, outcrops, lapiés and boulder fields of the Alps, the Apennines and the Northern Dinarides

- *Ericion carneae* Rübel 1933 (2b)
- *Rhododendrion hirsuti* Lakušić et al. 1979 (phantom)
- *Rhododendrion hirsuti* Lakušić in B. Jovanović, R. Jovanović et Zupančič et al. 1986 (2b, 5)

RHO-01B *Aquilegio nigricantis-Rhododendrion hirsuti* Čarni et Mucina 2015

Subalpine heath on rocky calcareous soils of the Central Dinarides

- *Lonicero borbasianae-Rosion alpinae* Redžić et al. 2000 (1)
- *Lonicero borbasianae-Rosion alpinae* Redžić et al. 2007 (2b, 5)

RHO-01C *Daphno blagayanae-Genistion radiatae* N. Ranđelović, Rexhepi et Jovanović ex Mucina et Theurillat *all. nov. hoc loco*

Relic supramontane to subalpine low heath on ultramafic and calcareous substrates of the Southern Dinarides

rho01 The name '*Daphno-Genistion radiatae*' was not validly published in Ranđelović & Rexhepi (1980) because the unique association listed for the alliance, the '*Daphno-genistetum radiatae* Ranđelović, Rexhepi et Jovanović 1979', was not validly published due to failure to designate the type relevé (ICPN art. 5). Therefore, the names of the association and the alliance are validated here. *Daphno blagayanae-Genistetum radiatae* Ranđelović, Rexhepi et Jovanović ex Mucina et Theurillat *ass. nov. hoc loco*; *holotypus hoc loco*: relevé 3 in Table 11 in Ranđelović et al. (1979: 992–993). *Daphno blagayanae-Genistion radiatae* Ranđelović, Rexhepi et Jovanović ex Mucina et Theurillat see above; *holotypus hoc loco: Daphno oleoidis-Genistetum radiatae* Ranđelović, Rexhepi et Jovanović ex Mucina et Theurillat *ass. nov. hoc loco*; the character species of the alliance are *Genista radiata* and *Daphne blagayana.* (LM, JPT)

- *Daphno oleoidis-Genistion radiatae* N. Ranđelović, Rexhepi et Jovanović 1969 (phantom)
- *Daphnion oleoidis* Lakušić 1968 (phantom)
- *Cytisanthion radiati* N. Ranđelović et Rexhepi 1979 (phantom)
- *Daphno blagayanae-Genistion radiatae* N. Ranđelović, Rexhepi et Jovanović ex N. Ranđelović & Rexhepi 1980 (2b)
- *Daphnion oleoidis* Lakušić in B. Jovanović, R. Jovanović et Zupančič et al. 1986 (2b)

VIR *Betulo carpaticae-Alnetea viridis* Rejmánek ex Bœuf, Theurillat, Willner, Mucina et Simler in Boeuf et al. 2014

Subalpine and subarctic herb-rich alder and willow scrub and krummholz of the Alps, the Carpathians, the

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Hercynicum, the Balkans, the Caucasus, Northern Europe and Greenland

vir01 We follow Huml et al. (1979) and several national and regional vegetation surveys (Julve 1993; Theurillat et al. 1995; Rivas-Martínez et al. 2002a, 2002b; Bardat et al. 2004; Boeuf et al. 2014) that pursued separation of the *Alnetalia viridis* (tall-herb rich subalpine scrub and krummholz as a class in its own right – the *Betulo carpaticae-Alnetea viridis*. (LM)

- *Betulo-Adenostyletea* Br.-Bl. et Tx. 1943 p.p. (2b)
- *Betulo-Adenostyletea* Br.-Bl. 1948 p.p. (3f)
- *Mugo-Alnetea viridis* Eggler 1952 p.p. (orig.form) (2b)
- *Betulo carpaticae-Alnetea viridis* Rejmánek in Huml et al. 1979 (2b, 5)
- *Salici-Alnetea viridis* Lacoste 1984 (phantom)
- *Salici-Alnetea viridis* Lacoste 1985 (2b)
- *Pino mugo-Alnetea alnobetulae* Eggler ex Julve 1993 p.p. (8)
- *Betulo-Alnetea viridis* Karner 2007 (3b)

VIR-01 *Alnetalia viridis* Rübel ex Karner et Willner in Willner et Grabherr 2007

Subalpine herb-rich alder and willow scrub and krummholz of the Alps, the Balkans and the Caucasus

- *Pino mugo-Alnetalia alnobetulae* Br.-Bl. 1918 (phantom)
- *Alnetalia viridis* Rübel 1933 (2b)
- *Mugo-Alnetalia viridis* Eggler 1952 (orig.form) (2b)
- *Veratro albi-Salicetalia appendiculatae* Passarge 1978 (3b)
- *Alnetalia viridis* Rübel ex Huml et al. 1979 (2b, 5)
- *Pino mugo-Alnetalia alnobetulae* Br.-Bl. ex Julve 1993 (2b)
- *Salicetalia hastatae* Bœuf, Theurillat et Simler in Boeuf et al. 2014 (syntax.syn.)

VIR-01A *Alnion viridis* Schnyder 1930

Subalpine green alder scrub on fertile soils of the Alps and the Balkans

- *Alnion alnobetulae* Schnyder 1930 *nom. mut. propos.* (45)
- *Alnion viridis* Aichinger 1933 (2b)
- *Alnion viridis* Rübel 1933 (2b)
- *Betulo-Alnion viridis* Gams 1936 (2b)
- *Alnion viridis* Lakušić et al. 1975 (phantom)
- *Alnion viridis* Lakušić et al. 1976 (31)
- *Alnion viridis* Rivas-Mart. et Géhu 1978 (31)
- *Alnion viridis* Rübel ex Huml et al. 1979 (8)
- *Alnion viridis* Rameau in Rameau et al. 1993 (2b, 3b)
- *Betulo carpaticae-Alnion alnobetulae* Gams 1936 (in Julve 1993) (2b, *mut.superfl.*)

VIR-01B *Salicion pentandrae* Br.-Bl. 1967

Subalpine calcicolous willow krummholz of the Alps

- *Salicion pentandrae* Br.-Bl. 1950 (2b)
- *Salicion arbusculae* (Oberd. 1979) Ellenberg 1978 (29)
- *Veratro albi-Salicion appendiculatae* Passarge 1978 (3b)
- *Salicion waldsteinianae* Lakušić et al. 1979 (2b)
- *Salicion waldsteinianae* Oberd. 1979 (syntax.syn.)
- *Salicion pentandrae* Karner in Willner et Grabherr 2007 (31)
- *Sorbo mougeotii-Lonicerion alpigenae* de Foucault 2012 (syntax.syn.)

VIR-01C *Salicion helveticae* Rübel ex Theurillat in Theurillat et al. 1995

Subalpine silicicolous willow krummholz of the Alps

- *Salicion arbusculae* Rübel 1933 (2b)
- *Salicion lapponum-glaucae* Gams 1936 (2b, 2d, 3b)
- *Salicion lapponum* Julve 1993 (phantom)

VIR-01D *Salicion silesiacae* Rejmánek et al. 1971

Subalpine willow scrub on fertile soils of the Western Carpathians and Eastern Hercynicum

VIR-01E *Pruno petraeae-Sorbion aucupariae* Rameau ex Seytre et Bœuf in Bœuf 2011

Subalpine mesic silicicolous scrub of the Massif Central, Vosges and Schwarzwald

- *Sorbion aucupariae* Rameau in Rameau et al. 1993 (3b)

VIR-02 *Rhamnetalia fallacis* P. Fukarek 1969

Relict deciduous scrub in the montane and subalpine belts of the Southern Alps, Dinarides and Apennines

vir02 Classification of these units within the '*Querco-Fagetea*' as suggested for instance by Trinajstić (2008: 106) is hardly acceptable. (LM)

- *Oreoherzogietalia fallacis* P. Fukarek 1969 *nom. mut. propos.* (45)

VIR-02A *Seslerio calcariae-Rhamnion fallacis* Dakskobler et al. 2013

Relict deciduous scrub in the montane and subalpine belts of the Southern Alps

VIR-02B *Lonicero-Rhamnion fallacis* P. Fukarek 1969

Relict deciduous scrub in the supramontane and subalpine belts of the Dinarides and Apennines

VIR-03 *Salicetalia glauco-lanatae* Bœuf et al. ex Mucina et Daniëls *ordo nov. hoc loco*

Subarctic and boreal herb-rich willow scrub and birch krummholz of the Holarctic

vir03 Here we validate this invalidly described (Boeuf et al. 2014: 116, 118) syntaxonomic concept by selecting the *Salicion callicarpeae* Daniëls in Mucina et al. 2016 (see Remark *vir04* below) as the *holotypus hoc loco*. The following taxa are to be considered diagnostic of the new order: *Alnus alaxensis, Betula pubescens* var. *pumila, Salix alaxensis, S. glauca, S. lanata, S. lapponum, S. myrsinithes, S. phylicifolia, S. pulchra* and *Sorbus groenlandica*. (LM, FD)

- *Salicetalia glauco-lanatae* Boeuf et al. 2014 (3b)

VIR-03A *Salicion phylicifoliae* Dierssen 1992

Willow scrub of montane stream banks in the boreal and subarctic zones of Northern Europe

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- *Polemonio acutiflori-Salicion lanatae* Boeuf et al. 2014 (3a, 2b)
- *Aconito septentrionali-Salicion lapponum* Boeuf et al. 2014 (8)

VIR-03B *Salicion callicarpeae* Daniëls *all. nov. hoc loco*

Low Arctic herb-rich willow scrub and krummholz of Greenland

vir04 This new alliance comprises thickets and low shrub vegetation of willows in the lowlands of subarctic and low-arctic Greenland characterized by (sub)oceanic climate, confined to wind-sheltered, relatively warm and sunny sites on level ground and foot slopes, and supported by sandy-gravelly, acidic, dry or temporary moist, mineral soil. The *holotypus (hoc loco)* of this alliance is the *Festuco-Salicetum callicarpeae* Daniëls 1982 (Daniëls 1982: 31 *et seq.*). I consider the name *Salicion callicarpeae* as more appropriate than the earlier, invalidly published *Pyrolo grandiflorae-Salicion callicarpeae* (Daniëls in Boeuf et al. 2014: 116). The diagnostic taxa of the alliance are: *Alchemilla glomerulans, Anemone richardsonii, Bistorta vivipara, Campanula rotundifolia, Carex bigelowii* subsp. *bigelowii, Cerastium alpinum, Epilobium angustifolium, Festuca rubra, Gnaphalium norvegicum, Hieracium hyparcticoides, H. laevigatum, H. lividorubens, Lycopodium annotinum, Orthilia secunda, Pyrola minor, Ranunculus acris, Salix glauca* subsp. *callicarpaea* and *Stellaria calycantha*. (FD)

- *Pyrolo grandiflorae-Salicion callicarpeae* Daniëls 1994 (phantom)
- *Pyrolo grandiflorae-Salicion callicarpeae* Daniëls in Boeuf et al. 2014 (2b, 5, 8)

VIR-03C *Geranio sylvatici-Betulion pumilae* Mucina et Willner *ined.*

Subalpine and boreo-maritime birch scrub and krummholz of Scandinavia

vir05 The formal description of this unit will be handled elsewhere. (LM)

VIR-04 *Rhododendro caucasici-Betuletalia litwinowii* Mucina *ordo nov. hoc loco*

Subalpine birch krummholz of the Caucasus

vir06 The floristic differences between the *Rhododendro caucasici-Betulion litwinowii* and other alliances classified in the *Betulo-Alnetea*, as well as unique biogeographic features of the Caucasus, when compared to other mountain ranges of the nemoral and boreal zones of Europe, motivate the recognition of a separate order, the *Rhododendro caucasici-Betuletalia litwinowii*, here introduced as a new syntaxonomic concept. The diagnostic species of this order are: *Astrantia maxima, Betula litwinowii, Cephalaria gigantea, Chaerophyllum aureum, Dolichorrhiza renifolia, Heracleum asperum* and *Rhododendron caucasicum*. The *holotypus (hoc loco)* of this order is the *Rhododendro caucasici-Betulion litwinowii* Onipchenko 2002 (Onipchenko 2002, Veröffentlichungen des Geobotanisches Institutes der ETH, Stiftung Rübel 130: 136–141). (LM)

VIR-04A *Rhododendro caucasici-Betulion litwinowii* Onipchenko 2002

Subalpine birch krummholz of the Caucasus

- *Sorbo-Betulion litwinowii* Onipchenko 2002 (2b)

MUL *Mulgedio-Aconitetea* Hadač et Klika in Klika et Hadač 1944

Tall-herb vegetation in nutrient-rich habitats moistened and fertilized by percolating water at high altitudes of Europe, Siberia and Greenland

mul01 This class concept encompasses tall-herb communities of eutrophic habitats and excludes herb-rich low scrub, here classified within the *Betulo carpaticae-Alnetea viridis*. (LM)

- *Adenostyletea* Knapp 1943 (1)
- *Betulo-Adenostyletea* Br.-Bl. et Tx. 1943 p.p. (2b)
- *Betulo-Adenostyletea* Br.-Bl. 1948 p.p. (3f)
- *Mulgedio-Aconitetea* Hadač et Klika ex Klika 1948 (31)
- *Aconito-Cardaminetea* Hadač 1956 p.p. (25)
- *Carduo-Cirsietea* Lakušić 1978 (2b)
- *Nardo-Calamagrostietea villosae* Jeník et al. 1980 (29c)
- *Adenostyletea* Lakušić 1985 (phantom)
- *Adenostyletea* Lakušić et al. 1987 (2b, 5)
- *Aconito-Geranietea* Zhitlukhina et Onishchenko 1989 (2b)
- *Aconito-Geranietea* Zhitlukhina et Onishchenko ex Chytrý et al. 1993 (syntax.syn.)
- *Cicerbito alpinae-Aconitetea napelli* Hadač et Klika in Klika et Hadač 1944 *corr*. Julve 1993 (*corr.superfl.*)

MERIDIONAL TO SUBBOREAL GROUP OF ORDERS

MUL-01 *Adenostyletalia alliariae* Br.-Bl. 1930

Tall-herb vegetation on fertile soils at high altitudes of temperate and mediterranean Europe

- *Adenostyletalia alliariae* G. Br.-Bl. et Br.-Bl. in G. Br.-Bl. 1931 (31)
- *Cirsietalia flavispinae* Quézel 1957 (syntax.syn.)
- *Rumicetalia balcanici* Lakušić 1973 (2b)
- *Cicerbitetalia* Lakušić 1978 (2b)
- *Adenostyletalia briquetii* Lacourt ex Géhu 1992 (2b)
- *Cirsietalia appendiculati* V. Ranđelović 2001 (phantom)
- *Cirsietalia appendiculati* V. Ranđelović et al. 2008 (2b)
- *Cirsietalia appendiculati* V. Ranđelović in V. Ranđelović et Zlatković 2010 (3b)
- *Rumicetalia balcanici* Lakušić in V. Ranđelović et Zlatković 2010 (2a, 2b)
- *Rumicetalia balcanici* Lakušić ex D. Lakušić et al. 2015 (syntax.syn.)

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GROUP OF CENTRAL EUROPEAN ALLIANCES

MUL-01A *Adenostylion alliariae* Br.-Bl. 1926 *nom. conserv. propos.*

Tall-herb vegetation on siliceous substrates at high altitudes in the nemoral zone of Europe

mul02 The name *Adenostylion alliariae* (*sensu* Zlatník 1925) cannot apply here, because in the original diagnosis Zlatník (l.c.) it included two associations, the *Athyrietum alpestris* and the *Calamagrostietum arundinaceae*. Therefore the name *Adenostylion alliariae* Zlatník 1925 could be applied as the oldest name of either the *Calamagrostion arundinaceae* or the *Dryopterido-Athyrion*. For the sake of nomenclatural stability, we suggest rejecting the *Adenostylion alliariae* Zlatník 1925 as a *nomen ambiguum*. In this regard the suggestion to preserve the *Adenostylion alliariae* Br.-Bl. 1926 as *nomen conservandum* was already made by Kočí in Chytrý (2007: 115). (KD, MC, LM)

- *Adenostylion alliariae* Zlatník 1925 *nom. ambig. rejic. propos.* (36)
- *mul03* See Remark *mul02*.
- *Adenostylion* Luquet 1926 (33)
- *Adenostylion* Br.-Bl. 1930 (31)
- *Aconition firmi* Krajina 1933 (syntax.syn.)
- *Alno-Adenostylion* Br-Bl. et Tx. 1943 (2b)
- *Alno-Adenostylion* Br-Bl. 1948 (syntax.syn.)
- *Alno-Adenostylion* (Br.-Bl. 1926) Horvat 1962 (phantom)
- *Aconition firmi* Borza et Boşcaiu 1965 (31)
- *Adenostylion pyrenaicae* Rivas-Mart. et al. 1984 (syntax. syn.)
- *Cirsion carduelis* de Foucault et Corriol 2013 (syntax.syn.)

MUL-01B *Dryopterido filicis-maris-Athyrion distentifolii* (Holub ex Sýkora et Šturs a 1973) Jeník et al. 1980

Fern-rich vegetation on fertile soils at high altitudes of the Alps, Carpathians, Hercynicum and Scandinavia

mul04 Kliment et al. (2004) failed to establish the identity of this alliance in the Carpathians, while Kočí in Chytrý (2007: 126–127, citing numerous other sources) considers this unit as an alliance in its own right. (LM)

MUL-01C *Delphinion elati* Hadač in Hadač et al. 1969

Submontane to subalpine calcicolous tall-herb vegetation of the Carpathians

mul05 Considering the silicicolous *Adenostylenion alliariae* and the calcicolous *Delphinenion elati* as two suballiances within the *Adenostylion* (e.g. Jarolímek & Šibík 2008) is not convincing on both floristic (see Tab. 6 in Kliment & Valachovič 2007) as well as ecological grounds, and therefore suggests retaining the *Adenostylion alliariae* and the *Delphinion elati* as alliances in their own right. (LM)

- *Delphinion elati* Hadač 1962 (2b)
- *Carduo-Urticion dioicae* Hadač 1962 (2b)
- *Carduo-Urticion dioicae* Hadač in Hadač et al. 1969 (syntax.syn.)

GROUP OF SOUTHERN EUROPEAN ALLIANCES

MUL-01D *Cirsion flavispinae* Quézel 1953

Tall-herb vegetation on fertile soils at high altitudes of the Sierra Nevada (Southern Iberian Peninsula)

MUL-01E *Doronicion corsici* Gamisans 1975

Tall-herb vegetation in the supramediterranean and oromediterranean belts of Corsica

- *Cymbalarion hepaticifoliae* Gamisans 1975 (syntax.syn.)
- *Cymbalarion hepaticifoliae* Gamisans 1977 (31)
- *Doronicion corsici* Gamisans 1977 (31)

MUL-01F *Cirsion appendiculati* Horvat et al. 1937

Tall-herb vegetation on acidic soils along mountain streams and water springs at high altitudes of the Eastern and Central Balkans

- *Geion coccinei* Horvat 1949 (phantom)
- *Geion coccinei* Horvat 1960 (2b)
- *Geion coccinei* Horvat in Quézel 1969 (syntax.syn.)
- *Geion rhodopei* V. Ranđelović et N. Ranđelović in Milosavlejić et al. 2008 (2b)
- *Knautio-Veratrion albae* Redžić et al. 2011 (2b, 5)

MUL-02 *Calamagrostietalia villosae* Pawłowski et al. 1928

Tall-grass and herb-rich vegetation on acidic and deep leached calcareous soils of the Alps, Carpathians and Hercynicum

- *Calamagrostietalia arundinaceae* Eggler 1952 (2b)

MUL-02A *Calamagrostion villosae* Pawłowski et al. 1928

Tall-herb and herb-rich vegetation on acidic and deep leached soils in the subalpine and alpine belts of the Alps, Carpathians and Hercynicum

- *Calamagrostion villosae* Br.-Bl. 1930 (31)
- *Poo chaixii-Deschampsion caespitosae* Jeník et al. 1980 (29c)

MUL-02B *Trisetion fusci* Krajina 1933

Tall-grass and herb-rich vegetation on alluvial acidic soils along alpine streams of the Carpathians

- *Deschampsion caespitosae* Borza 1934 (29c, 31)
- *Phleo alpini-Deschampsion caespitosae* Csűrös et al. 1985 (5)

MUL-02C *Calamagrostion arundinaceae* (Luquet 1926) Oberd. 1957

Tall-grass and herb-rich vegetation on dry acidic soils in the upper montane and subalpine belts of the mountain ranges of suboceanic Europe

- *Calamagrostion atlanticum* Luquet 1926 (34a)
- *Calamagrostion* Oberd. 1949 (2b)
- *Dryopteridion* Eggler 1952 (2b)
- *Calamagrostion* Oberd. 1956 (2b)
- *Calamagrostion arundinaceae* (Luquet 1926) Jeník 1961 (32a)
- *Ligustico mutellinae-Luzulion desvauxii* Michalet et Philippe 1994 (5)
- *Luzulion desvauxii* Coquillard et al. 1994 (3b)

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MUL-03 *Petasito-Chaerophylletalia* Morariu 1967
Tall-herb vegetation on nutrient-rich soils along mountain streams of Central Europe, the Balkans and the Apennines
MUL-03A *Petasition officinalis* Sillinger 1933
Tall-herb vegetation on raw alluvia of streams in the upper colline to supramontane belts of the Carpathians and the Hercynicum
mul06 The type association of the *Petasition officinalis* Sillinger 1933 (Kliment & Jarolímek 2002: 107) is the relevé 1 on page 134 in Sillinger (1933). According to Michl et al. (2010) this type relevé can clearly be assigned to the lowland tall-herb communities due to the prevalence of many diagnostic species of the *Artemisietea vulgaris* and *Filipendulo-Calystegietea* (*Aegopodium podagraria, Anthriscus sylvestris, Filipendula ulmaria, Galium aparine, Petasites hybridus*). It is for this reason that Michl et al. (2010) suggested classifying the *Petasition officinalis* Sillinger 1933 within the *Filipendulo-Calystegietea*. (LM)
- *Adenostylion alliariae* Aichinger 1933 (32a)
- *Petasition hybridi* Sillinger 1933 *nom. mut. propos.* (45)

mul07 The proposal to use the mutated form of the name (*Petasitetum hybridi*) dates back to at least to Soó (1980). Formal proposal for mutating the name was done by Kočí in Chytrý (2009: 313). (LM)
- *Petasition officinalis vel albae* (Sillinger 1933) Klika 1954 (*sensu* Klika 1955) (phantom)
- *Petasition albae* (Sillinger 1933) Klika 1955 (*sensu* Passarge 1978) (phantom)
- *Petasition officinalis vel albae* (Sillinger 1933) Klika 1955 (29c, 41b)
- *Telekion speciosae* Morariu 1967 (2b)
- *Chaerophyllo-Petasition hybridi* Kopecký 1968 (2b)
- *Petasito hybridi-Chaerophyllion hirsuti* (Sillinger 1933) Niemann et al. 1973 (29c)
- *Telekion speciosae* Morariu ex Resmeriţă et Raţiu 1974 (syntax.syn.)

MUL-03B *Arunco-Petasition albi* Br.-Bl. et Sutter 1977
Tall-herb vegetation on skeletal nutrient-rich soils on steep slopes in the montane and supramontane belts of the Alps
MUL-03C *Senecionion samniti* Bonin 1978
Tall-herb vegetation on nutrient-rich alluvia along mountain streams of the Central and Southern Apennines
- *Senecioni cordati-Chaerophyllion hirsuti* Hruška 1986 (syntax.syn.)
- *Adenostylion glabrae* Castelli et al. 2001 (2b)
- *Adenostylion alpinae* Castelli, Biondi et Ballelli in Biondi et al. 2014 (syntax.syn.)
- *Aconition neapolitani* Biondi et Allegrezza in Biondi et al. 2014 (syntax.syn.)

MUL-04 *Senecioni rupestris-Rumicetalia alpini* Mucina et Karner *ordo nov. hoc loco* *Tall-herb anthropogenic vegetation on nutrient-rich soils in the upper montane to alpine belts of the nemoral mountain ranges of Europe*
mul08 Karner & Mucina (1993) invalidly published the name *Rumicetalia alpini*, because there was no 'unambiguous reference made to the source of the type alliance – the '*Rumicion alpini* Klika in Klika et Hadač 1944'. Moreover, in Klika & Hadač (1944) an unambiguous reference to the only element ('*Rumicetum alpini carpaticum* Szaf.-Pawl.-Kulcz. 1935') is also missing since the latter authors failed to provide a reference to 'Szaf.-Pawl.-Kulcz. 1935'; thus, the *Rumicion alpini* Klika in Klika et Hadač is invalid (ICPN art. 8). In order to avoid further confusion, I coin here a new name – the *Senecioni rupestris-Rumicetalia alpini* and selected the *Rumicion alpini* Rübel ex Scharfetter 1938 (Scharfetter 1938: 261–262) as the *holotypus (hoc loco)* of the order. The diagnostic taxa of the *Senecioni rupestris-Rumicetalia alpini* are: *Alchemilla glabra, Cirsium spinosissimum, Gagea fistulosa, Rumex alpinus, Veratrum album* subsp. *album, V. album* subsp. *lobelianum, Verbascum longifolium.* (LM)
- *Rumicetalia alpini* Mucina 1991 (2b)
- *Rumicetalia alpini* Mucina in Karner et Mucina 1993 (5)
- *Senecioni rupestris-Rumicetalia alpini* Mucina in Mucina et al. 2010 (*sensu* Ermakov 2012) (phantom)
- *Senecioni rupestris-Rumicetalia alpini* Mucina in Šilc et Čarni 2012 (2b, 5)

MUL-04A *Rumicion alpini* Scharfetter 1938
Tall-herb anthropogenic vegetation on nutrient-rich soils in the upper montane to alpine belts of the nemoral mountain ranges of Europe
- *Rumicion alpini* Rübel 1933 (2b)
- *Rumicion alpini* Rübel ex Klika in Klika et Hadač 1944 (31)
- *Chenopodion subalpinum* Br.-Bl. 1949 (phantom)
- *Chenopodion subalpinum* Br.-Bl. 1950 (34a)

mul09 The correct publication date of the name '*Chenopodion subalpinum all. nova*' published in Braun-Blanquet (1949a) is 1950 because it is in Braun-Blanquet (1950) where the bibliographical references to the relevés of the original diagnosis of the '*Chenopodietum subalpinum ass. nova*' (*recte*: *Chenopodietum subalpinum* Br.-Bl. 1950 *nom. illeg.;* ICPN art. 34) are listed. Therefore, the correct citation of the alliance name is the *Chenopodion subalpinum* Br.-Bl. 1950. (JPT)
- *Plantaginion reniformis* Lakušić 1970 (2b)
- *Rumicion alpini dinaricum silicicolum* Lakušić 1979 (5)
- *Rumicion pseudalpini* Klika in Klika et Hadač 1944 *corr.* Loidi et Biurrun 1996 (43, *corr.inval.*)
- *Rumicion pseudalpini* Rübel ex Scharfetter 1938 *corr.* Rivas-Mart. et al. 2011 (43, *corr.inval.*)
- *Rumicion pseudalpini* Rübel ex Scharfetter 1938 *corr.* Loidi et Biurrun 1996 (phantom)

mul10 The taxonomic nomenclatural issues surrounding the priority of *Rumex pseudoalpinus* Höfft and *Rumex alpinus*

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L. and the nomenclatural decision can be followed in a series of contributions in Taxon (Taxon 40: 571, 2000; Taxon 51: 796. 2002 [2003]; Taxon 55: 798. 2006). (LM)
- *Rumici alpini-Chenopodion* (Br.-Bl. 1948) Redžić 2011 (29)

BOREAL-SUBARCTIC GROUP OF ORDERS

MUL-05 *Epilobio lactiflori-Geranietalia sylvatici* Michl et al. 2010

Tall-herb vegetation on nutrient-rich soils in the montane to alpine belts of Fennoscandia, the Arctic Ocean islands and Greenland
- *Aconitetalia* Nordhagen 1936 (phantom)
- *Aconitetalia* Nordhagen 1937 (2b)
- *Adenostyletalia* Nordhagen 1936 (2b)
- *Betulo-Aconitetalia* Br.-Bl. 1950 (2b)

MUL-05A *Mulgedion alpini* Nordhagen 1943

Tall-herb vegetation on nutrient-rich soils in the montane to alpine belts of Fennoscandia and the Arctic Ocean islands
- *Aconition septentrionalis* Nordhagen 1936 (phantom)
- *Aconition septentrionalis* Nordhagen 1937 (2b)
- *Geranio-Cirsion heterophylli* Kalliola 1939 (2b)
- *Lactucion alpinae* Nordhagen 1943 *nom. mut. propos.* (45)
- *Cicerbition alpinae* Nordhagen 1943 *nom. mut. propos.* (45)
- *Dryopterido-Calamagrostion purpureae* Nordhagen 1943 (2b)

MUL-06 *Schulzio crinitae-Aquilegietalia glandulosae* Ermakov et al. 2000

Tall-forb vegetation on moist, seasonally frozen soils at high altitudes in the boreal zone of the Northern Urals and in the subarctic zone of northwestern Siberia

MUL-06A *Polemonio acutiflori-Veratrion lobeliani* Telyatnikov 2012

Tall-forb vegetation on moist, seasonally frozen soils of the subarctic foothills of the European part of the Northern Urals

MUL-07 *Trollio-Crepidetalia sibiricae* Guinochet ex Chytrý et al. 1993

Tall-forb vegetation on fertile soils in the montane to subalpine belts in the boreal zone of the Urals and Siberia
- *Trollio-Crepidetalia sibiricae* Guinochet 1982 (2b)

MUL-07A *Triseto sibirici-Aconition septentrionalis* Ermakov et al. 2000

Tall-forb vegetation on fertile soils in the montane to subalpine belts in the boreal zone of the Urals

TRI *Juncetea trifidi* Hadač in Klika et Hadač 1944

Acidophilous grasslands in the alpine belt of the nemoral zone of Europe, the Caucasus and in the boreo-arctic and arctic zones of Northern Europe and Greenland

tri01 The protologue of the class is based on syntaxa nowadays included into several classes, such as the *Loiseleurio-Vaccinietea, Thlaspietea rotundifolii* and *Salicetea herbaceae*. The proposal to reject the name of this class as a *nomen ambiguum* was presented in Grabherr & Mucina (1993: 344; see also Theurillat 1997 and Kliment & Valachovič 2007: 326). (LM) Some authors of this paper (MC, LM) do not consider the latter proposal qualifying this name as a *nomen ambiguum* as justified because it has probably never been applied in a false sense that would exclude elements of the original diagnosis.
- *Juncetea trifidi* Hadač 1946 (5)
- *Caricetea curvulae* Br.-Bl. 1948 (syntax.syn.)

tri02 In case the name *Juncetea trifidi* is rejected, the name *Caricetea curvulae* Br.-Bl. 1948 (see also Theurillat et al. 1995; Buffa et al. 2002) would then become the valid name for this syntaxonomic concept. (LM, KD)
- *Caricetea curvulae* Br.-Bl. 1949 (31)
- *Festucetea airoidis* Peyre et Font 2011 (2b)
- *Festucetea eskiae* Peyre et Font 2011 (2b)

TRI-01 *Juncetalia trifidi* Daniëls 1994

Arctic and boreo-arctic rush swards on siliceous substrates of Northern Europe, Svalbard, Iceland, Greenland and as glacial relict at high altitudes of the Hercynicum

TRI-01A *Carici-Juncion trifidi* Nordhagen 1943

Arctic and boreo-arctic rush swards on siliceous substrates of Scandinavia, Svalbard and Iceland
- *Hierochloo orthanthae-Juncion trifidi* Knapp 1964 (syntax. syn.)

TRI-01B *Nardo-Caricion rigidae* Nordhagen 1943

Moderately chionophilous siliceous mat-grass swards of Scandinavia and as relicts in the Hercynian mountains

tri03 This alliance should be classified within the *Salicetalia herbaceae*. (FD) Koroleva (1999) has, however, documented a stark difference between the *Nardo-Caricion bigelowii* and *Cassiopo-Salicion herbaceae*. (LM)
- *Nardo-Caricion rigidae* Nordhagen 1936 (phantom)
- *Nardo-Caricion rigidae* Nordhagen 1937 (2b)
- *Nardo-Agrostion capillaris* Nordhagen 1936 (phantom)
- *Nardo-Agrostion capillaris* Nordhagen 1937 (2b)
- *Nardo-Caricion bigelowii* Nordhagen 1936 *nom. mut. propos.* (*mut.illeg.*)
- *Nardo-Agrostion capillaris* Nordhagen 1943 (31)
- *Nardo-Caricion bigelowii* Nordhagen 1943 *nom. mut. propos.* (*mut.superfl.*)

tri04 For the reasons underpinning the proposal see Kočí in Chytrý (2007: 80). (LM)
- *Nardion boreale* Preising 1949 (1)
- *Ranunculo-Anthoxanthion* Gjaerevoll 1950 (syntax.syn.)
- *Ranunculo-Anthoxanthion* Knapp 1964 (31)
- *Alchemillo alpinae-Erigeronion borealis* Knapp 1964 (syntax.syn.)

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TRI-01C *Cladonio-Viscarion alpinae* Daniëls 1982
Moderately chionophilous siliceous graminoid-lichen grasslands on niveo-aeolian soils of the Low Arctic regions of Scandinavia and Greenland
TRI-01D *Lagotido uralensis-Caricion ensifoliae* Chytrý et Mucina in Chytrý et al. 2015
Silicicolous alpine grasslands of the Southern Urals
- *Anemonastro sibirici-Festucion ovinae sensu* Ishbirdin et al. 1996; non Chytrý et al. 1993 (pseudonym)

TRI-02 *Caricetalia curvulae* Br.-Bl. in Br.-Bl. et Jenny 1926
Alpine and subalpine silicicolous swards of the mountain ranges in the nemoral zone of Europe
- *Festucetalia airoidis* Peyre et Font 2011 (2b)
- *Festucetalia eskiae* Peyre et Font 2011 (2b)

TRI-02A *Caricion curvulae* Br.-Bl. 1925
Alpine sedge swards on siliceous substrates of the Alps, and the Eastern and Southern Carpathians
TRI-02B *Juncion trifidi* Krajina 1933
Alpine rush swards on siliceous substrates of the Western Carpathians and the northern ranges of the Eastern Carpathians
- *Juncion trifidi* Soó 1929 (2b)
- *Juncion trifidi* Krajina 1934 (phantom)

TRI-02C *Festucion supinae* Br.-Bl. 1948
Alpine chionophobous tussock grasslands on cryoturbated siliceous substrates of the Pyrenees
- *Festucion airoidis* Br.-Bl. 1948 *nom. mut. propos.* (45)

tri05 The formal proposal serving this name change has been published by Rivas-Martínez et al. (2002a: 260). (LM)
- *Festucion alpinae* Borza 1958 (2b)

TRI-02D *Anemonion speciosae* Minaeva ex Onipchenko 2002
Alpine swards on siliceous substrates of the Caucasus
- *Anemonion speciosae* Minaeva 1987 (1)
- *Alchemillo caucasicae-Campanulion tridentatae* Korotkov et Belonovskaya 2000 (2b, 5)

TRI-03 *Festucetalia spadiceae* Barbero 1970
Subalpine and alpine acidophilous species-rich grasslands of the Alps, the Carpathians and the Northern Apennines
- *Brachypodietalia pyrenaica* Nègre 1969 (34a)
- *Trifolio alpini-Meetalia athamantici* de Foucault 1994 (29)

NARDUS-DOMINATED SPECIES RICH SWARDS
TRI-03A *Carici macrostylido-Nardion* (Rivas-Mart. et al. 1984) de Foucault 1994
Mat-grass chionophilous swards at high altitudes of the Pyrenees and the Cantabrian Mountains
TRI-03B *Nardion strictae* Br.-Bl. 1926
Mat-grass chionophilous swards in the subalpine and alpine belts of the Alps, the Carpathians and the Northern Apennines

tri06 Rivas-Martínez et al. (2011: 303) prefer classifying this unit within the *Nardetalia*. (LM)
- *Nardion* Luquet 1933 (31)
- *Nardion strictae alpinum* Borza 1943 (2b)
- *Eu-Nardion* Oberd. 1949 (2b)
- *Eu-Nardion* Oberd. 1950 (34b)
- *Trifolion alpini-Nardion* Preising 1949 (1)
- *Nardion strictae alpinum* Puşcaru et al. 1956 (34a)
- *Diphasiastro-Nardion* (Br.-Bl. in Br.-Bl. et Jenny 1926) Ellenberg 1978 (29)
- *Campanulo barbatae-Potentillion aureae* de Foucault 1994 (syntax.syn.)
- *Galio saxatilis-Potentillion aureae* de Foucault 1994 (2b)

TRI-03C *Potentillo ternatae-Nardion* Simon 1958
Oligotrophic mat-grass swards of mountain ranges of the southern and central regions of the Balkan Peninsula
- *Nardion strictae* Horvat 1937 (2b)
- *Potentillo ternatae-Nardion* Simon 1957 (phantom)

FESTUCA- AND AGROSTIS-DOMINATED TUSSOCK GRASSLANDS
TRI-03D *Festucion variae* Br.-Bl. ex Guinochet 1938
Tussock grasslands on decalcified soils at high altitudes of the Alps and the Pyrenees
tri07 The name '*Festucion variae* J. Braun-Blanquet 1926' was validly published in Guinochet (1938) who also validly published two associations in the original diagnosis, such as the 'association à *Festuca spadicea et Centaurea uniflora* J. Braun-Blanquet 1926 *nomen nudum* M. Guinochet' and the 'association à *Festuca varia* subsp. *eu-varia* var. *scabriculmis et Potentilla valderia* M. Guinochet *nov. ass.*'. (JPT)
- *Festucion variae* Br.-Bl. 1925 (2b)
- *Festucion variae* Br.-Bl. 1926 (2b)

tri08 The name '*Festucion variae*' in Braun-Blanquet (1926b) was invalidly published because *Festuca varia* is absent from the unique relevé for the association à *Festuca spadicea et Chrysanthemum Delarbrei*' of the original diagnosis and there is no bibliographical reference to the association '*Festucetum variae*' made in the text. (JPT)
- *Caricion sempervirentis* Rübel 1933 (2b)
- *Festucion spadiceae* Br.-Bl. 1972 (31)
- *Cerastio-Festucion violaceae* Ubaldi 2011 (2b)
- *Hyperico richeri-Festucion spadiceae* (Br.-Bl. 1972) de Foucault 2012 (syntax.syn.)

TRI-03E *Agrostion schraderianae* Grabherr 1993
Open grasslands of disturbed avalanche tracks in the subalpine and alpine belts of the Eastern Alps
TRI-03F *Festucion eskiae* Br.-Bl. 1948
Subalpine chionophilous tussock grasslands on decalcified oligotrophic substrates of the Pyrenees and the Cantabrian Mountains
- *Festucion spadiceae* Nègre 1969 (syntax.syn.)

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tri09 Rivas-Martínez *et al.* (2011: 278) prefer to classify this unit within the *Ononidetalia striatae* (*Festuco hystricis-Ononidetea striatae*) – an opinion we do not share. (LM)

- *Festucion paniculatae* Nègre 1969 *nom. mut. propos.* (45)
- *Campanulo herminii-Festucion eskiae* de Foucault 1994 (2b)

TRI-04 *Gentianello columnae-Festucetalia italicae* Di Pietro, Terzi, Fortini *ined.*

Subalpine and alpine acidophilous and chionophilous grasslands on leached soils of gullies and snow-beds, and on acidic nutrient-poor leached soils over calcareous and siliceous bedrocks the Central and Southern Apennines

TRI-04A *Festuco italicae-Nardion strictae* Di Pietro, Terzi et Fortini *ined.*

Acidophilous chionophilous mat-grass swards on calcareous and siliceous substrates of the subalpine and alpine belts of the Central Apennines

- *Caricion kitaibelianae* Migliaccio 1970 (3b)
- *Festucion violaceae* Avena et Bruno 1975 (3b)
- *Festucion macratherae* Petriccione et Persia 1995 (5)

TRI-04B *Ranunculo -Nardion strictae* Bonin 1972

Acidophilous mat-grass chionophilous swards on leached calcareous substrates in the subalpine belt of the Southern Apennines

- *Ranunculo-Nardion strictae* Bonin 1970 (phantom)
- *Ranunculo-Nardion strictae* Bonin 1971 (2b)
- *Ranunculo pollinensis-Nardion strictae* Bonin 1972 (40a, *corr.illeg.*)
- *Ranunculo-Nardion strictae* Bonin 1978 (phantom)

TRI-05 *Festucetalia woronowii* Tsepkova 1987

Alpine acidophilous species-rich grasslands of the Caucasus

TRI-05A *Festucion woronowii* Tsepkova 1987

Alpine acidophilous species-rich grasslands of the Caucasus

- *Anemonion speciosae* Minaeva 1987 (1)
- *Hedysaro caucasicae–Geranion gymnocauli* Onipchenko 2002 (syntax.syn.)

tri10 The *Festucion woronowii* Tsepkova 1987 and the *Hedysaro caucasicae-Geranion gymnocauli* Onipchenko 2002 demonstrate a high degree of floristic similarity and therefore should be considered as one syntaxonomic concept. (NE, LM)

- *Violo altaicae–Festucion variae* Onipchenko 2002 (syntax. syn.)

tri11 In case this syntaxon would be recognized as different to the *Festucion woronowii* Tsepkova 1987, its name has to be corrected to the *Violo altaicae-Festucion woronowii*. *Festuca varia* Haenke *s.str.* is endemic to the Alps (Wallosek 1999). This name has been applied in the Caucasus to *Festuca woronowii* Hack. (*F. varia* complex) which has two subspecies in the Caucasus – subsp. *woronowii* and subsp. *caucasica* (St.-Yves) E.B. Alexeev (syn. F. *karabaghensis* Mussajev). (LM)

TRI-06 *Udo-Nardetalia* Quézel 1953

Relict supra- to -cryomediterranean mat-grass swards of the Iberian Peninsula and North African Atlas

tri12 The inclusion of the oro-cryomediterranean zonal mat-grass communities occurring in the Sierra Nevada (e.g. Quézel 1953) and North African Atlas mountains as a suborder (*Campanulo herminii-Nardenalia* Rivas-Mart. et al. 1986) within the *Nardetalia strictae* Preising 1950 (described to accommodate secondary and intensively grazed mat grasslands of medium and low altitudes of Western and Central Europe) lacks convincing reasoning. The supra- to cryomediterranean Betic-African, endemic-rich mat grasslands are known as the *Udo-Nardetalia* (Quézel 1953, 1964; Krahulec 1985) and as such are of relict character and rich in endemics. They can also be considered as a biogeographic analogon of the *Trifolietalia parnassi* (*Trifolio anatolicae-Polygonetea arenastri)* known from the Hellenic mainland and from Anatolia. The classification of this order within the *Festucetea indigestae* (and redefinition of the latter as the geographic analogue of the *Juncetea trifidi*) is worth investigation. (LM) Contrary to the opinion of de Foucault (2012), the name *Udo-Nardetalia* is not illegitimate according to ICPN art. 34. Indeed, '*udo'* is an ecological prefix (IPCN art. 12) based on the Latin word '*udus*', which means 'saturated with water, humid, wet'. The name *Udo-Nardetalia* was coined for wet meadows dominated by *Nardus stricta* in the 'pozzines complex' – a perfectly fitting term, coined by de Litardière for Corsica according to Quézel (1953: 49). (JPT)

- *Sagini nevadensis-Nardetalia strictae* de Foucault 2012 (29)

TRI-06A *Campanulo herminii-Nardion strictae* Rivas-Mart. 1964

Relict supra-oromediterranean mat-grass swards of the mountain ranges of the Central and Western Iberian Peninsula

TRI-06B *Plantaginion thalackeri* Quézel 1953

Relict oro-cryomediterranean hygrophilous and chionophilous mat-grass swards of the Sierra Nevada (Southern Iberian Peninsula)

- *Plantaginion nivalis* Quézel 1953 *nom. mut. propos.* (45)

tri13 The formal proposal serving this name change was published by Rivas-Martínez et al. (2002a: 272). (LM)

TRI-07 *Seslerietalia comosae* Simon 1958

Alpine and subalpine silicicolous grasslands of the Balkan Peninsula

- *Seslerietalia comosae* Simon 1957 (phantom)

TRI-07A *Poion violaceae* Horvat et al. 1937

Alpine and subalpine silicicolous grasslands on deep acidic soils in wind-sheltered habitats of the Balkan Peninsula

tri14 In the protologue of this alliance Horvat et al. (1937: 174, see footnote) suggested that this alliance was earlier described as the '*Festuceto-Poion violaceae*' however these

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authors suggested a simplified name – the '*Poion violaceae*'. However, the *Festuco-Poion violaceae* was invalidly described in Horvat (1937) and therefore the introduction of a *nomen novum* (ICPN art. 29) does not apply in this case. On the other hand, the *Poion violaceae* was clearly validly described by Horvat et al. (1937) since the only association (*Festucetum validae* Horvat et al. 1937) classified within the this alliance was a syntaxonomic concept carrying a valid name. (LM)

- *Festuco-Poion violaceae* Horvat 1936 (2b)
- *Festucion valido-paniculatae* N. Ranđelović 1974 (phantom)
- *Bellardiochloion violaceae* Sanda et al. 2001 (31)
- *Festucion valido-paniculatae* (N. Ranđelović 1974) V. Ranđelović 2001 (phantom)
- *Festucion valido-paniculatae* N. Ranđelović et al. 2008 (2b)
- *Genistion sericeae* N. Ranđelović 2008 (phantom)
- *Genistion sericeae* Milosavljević et al. 2008 (2b, 5)
- *Festucion valido-paniculatae* V. Ranđelović in V. Ranđelović et Zlatković 2010 (2b)

TRI-07B *Seslerion comosae* Horvat et al. 1937

Alpine and subalpine silicicolous grasslands on deep acidic soils in wind-exposed habitats of the Balkan Peninsula

- *Seslerion comosae* Horvat 1935 (2b)
- *Seslerion comosae* Horvat 1936 (2b, 3b)
- *Jasionion orbiculatae* Lakušić 1964 (1)
- *Jasionion orbiculatae* Lakušić 1966 (syntax.syn.)
- *Gentianello crispatae-Nardion* Redžić 1990 (1)
- *Gentiano crispatae-Nardion* Redžić 2007 (2b, 5)

TRI-07C *Campanulion albanicae* Lakušić 1966

Subalpine grasslands on slightly acidic soils of Montenegro and Kosovo

- *Campanulion albanicae* Lakušić 1964 (phantom)
- *Campanulion linifoliae* Lakušić 1964 (1)
- *Campanulion linifoliae* Lakušić 1966 (phantom)
- *Festucion albanicae* Lakušić 1967 (phantom)
- *Festucion albanicae* Lakušić 1968 (29)
- *Festucion albanicae* Lakušić 1969 (phantom)

SES *Elyno-Seslerietea* Br.-Bl. 1948

Alpine and subalpine calcicolous swards of the nemoral mountain ranges of Europe

- *Elyno-Seslerietea* Br.-Bl. in Br.-Bl. et al. 1947 (2b)
- *Kobresio myosuroidis-Seslerietea caeruleae* Br.-Bl. 1948 *nom. mut. propos.* (45)

ses01 The formal proposal serving this name change was published by Rivas-Martínez et al. (2002a: 266). (LM) This proposal is irrelevant since the newest systematic studies in *Carex* (Global Carex Group 2015) show that *Kobresia* and *Carex* form a monophyletic group. (LM, JPT)

- *Seslerietea* Oberd. 1949 (2b)
- *Elyno-Seslerietea pyrenaica* Rigual et al. 1963 (2b)
- *Festuco-Seslerietea* Barbero et Bonin 1969 (syntax.syn.)
- *Seslerietea variae* Oberd. 1978 (29c)
- *Seslerietea albicantis* Oberd. 1978 *corr.* Oberd. 1990 (29c, *corr.superfl.*)
- *Seslerietea juncifoliae* Trinajstić 2008 (syntax.syn.)

SES-01 *Seslerietalia caeruleae* Br.-Bl. in Br.-Bl. et Jenny 1926

Alpine and subalpine calcicolous grasslands of the nemoral mountain ranges of Central Europe

- *Seslerietalia variae* Br.-Bl. in Br.-Bl. et Jenny 1926 *nom. corr. propos.* (*corr.superfl.*)
- *Dryadeto-Seslerietalia* Nordhagen 1936 (orig.form) (phantom)
- *Elyneto-Seslerietalia* Nordhagen 1936 (orig.form) (phantom)
- *Elyneto-Seslerietalia* Nordhagen 1937 (orig.form) (2b. 29, 41b)
- *Seslerietalia calcareae* Br.-Bl. in Br.-Bl. et Jenny 1926 *corr.* Klika in Klika et Hadač 1944 (*corr.superfl.*)
- *Loiseleurietalia procumbentis* Wendelberger 1962 (syntax.syn.)

ses02 The name *Loiseleurietalia procumbentis* is validly published in Wendelberger (1962). The original diagnosis of the order contains the unique alliance '*Loiseleurio-Vaccinion* Br.-Bl. 1926', which is lacking a bibliographical reference to Braun-Blanquet (1926a). However, the unique association given for the alliance, the '*Loiseleurietum calcicolum dachsteinense* Wendelb. 1962' is validly published although it is illegitimate (IPCN art. 34a). Therefore, the name '*Loiseleurio-Vaccinion* Br.-Bl. ex Wendelberger 1962' (IPCN art. 31) is validly published, and so is then validly published also the *Loiseleurietalia procumbentis* Wendelberger 1962. (JPT)

- *Caricetalia firmae* Wendelberger 1962 (syntax.syn.)
- *Seslerietalia tatrae* Hadač 1962 (8)
- *Seslerietalia tatrae* Hadač in Hadač et al. 1969 (syntax. syn.)
- *Seslerietalia albicantis* Br.-Bl. in Br.-Bl. et Jenny 1926 *corr.* Oberd. 1983 (*corr.superfl.*)

ALPIC-CARPATHIAN GROUP OF ALLIANCES

SES-01A *Seslerion caeruleae* Br.-Bl. in Br.-Bl. et Jenny 1926

Supramontane to alpine calcicolous subxerophilous blue-grass swards of the Central and Eastern Alps

- *Seslerion variae* Br.-Bl. in Br.-Bl. et Jenny 1926 *nom. corr. propos.* (*corr.superfl.*)
- *Seslerion albicantis* Br.-Bl. in Br.-Bl. et Jenny 1926 *corr.* Oberd. 1983 (*corr.superfl.*)

SES-01B *Caricion austroalpinae* Sutter 1962

Supramontane to alpine calcicolous subxerophilous swards of the Southern Alps

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SES-01C *Caricion ferrugineae* G. Br.-Bl. et Br.-Bl. in G. Br.-Bl. 1931

Supramontane to alpine calcicolous meso-hygrophilous sedge swards of the Alps and the Carpathians

- *Calamagrostion variae* Sillinger 1932 (syntax.syn.)

ses03 The inclusion of the *Calamagrostion variae* into the *Caricion ferrugineae* follows Theurillat et al. (1995). (JPT, JD, LM)

- *Caricion ferrugineae* Höhn 1936 (31)
- *Anthoxantho-Plantaginion brutiae* Barbero et Quézel 1976 (syntax.syn.)
- *Laserpition latifolii* Richard 1977 (3b)

ses04 The placement of the *Laserpition latifolii* (as well as the *Laserpition sileris* Misset 2015) in the *Caricion ferrugineae* is tentative, and requires further studies to establish the distinction nature of these vegetation units in relations to the between the *Trifolio-Geranietea*. (LM, JPT)

- *Festucion carpaticae* Bělohlávková et Fišerová 1989 (syntax.syn.)

ses05 The identity of this unit remains contentious since one of the major motivations for description of this alliance was the discordance of opinions about the classification of this vegetation type into a higher syntaxon that would straddle the transition between the *Calamagrostion villosae* and the *Seslerion tatrae* (see Kliment & Valachovič 2007: 82 for brief discussion of the problem). It appears that the classification in the *Caricion ferrugineae*, however, is a plausible possibility. (LM)

- *Laserpition sileris* Misset 2014 (2b)
- *Laserpition sileris* Misset 2015 (syntax.syn.)

SES-01D *Caricion firmae* Gams 1936

Wind-exposed calcicolous sedge swards in the alpine belt of the Alps and the Carpathians

- *Caricion firmae* Hadač 1962 (2b)
- *Loiseleurio-Vaccinion* Br.-Bl. ex Wendelberger 1962 (31)
- *Loiseleurion calcicolum* Wendelberger 1970 (phantom)
- *Loiseleurion calcicolum* Wendelberger 1971 (2b)
- *Caricion firmae* Wendelberger 1962 (31)

SES-01E *Astero alpini-Seslerion calcariae* Hadač in Hadač et al. 1969 *nom. invers. propos.*

Alpine and subalpine calcicolous subxeric blue-grass swards of the Western Carpathians

ses06 For the proposals published to this effect see Kliment et al. (2005), Kliment & Valachovič (2007: 163) and Jarolímek & Šibík (2008). This suggestion is motivated obviously by the dominant position of *Sesleria caerulea (*syn. *S. calcaria)* while *Aster alpinus* plays only a subordinate role. (LM)

- *Seslerio-Asterion alpini* Hadač in Hadač et al. 1969 (orig.form) (42)

ses07 Two suballiances described by Kliment et al. (2005; see also Kliment & Valachovič 2007), such as the *Astero alpini-Seslerienion calcariae* Kliment et al. 2005 and the *Pulsatillo slavicae-Caricenion humilis* Uhlířová in Kliment et al. 2005 might also be interpreted at the alliance level, since the floristic differentiation is very strong and both units reflect general altitudinal zonation of the Carpathians. (LM)

- *Astero-Seslerion calcariae* Hadač et Smola 1962 (2b)
- *Seslerio-Asterion alpini* Hadač 1962 (2b)
- *Astero serpentimontani-Seslerion* Hadač 1962 *corr*. Mucina 1981 (2b, *corr.superfl.*)

SES-01F *Seslerion tatrae* Pawłowski 1935 *corr*. Klika 1955

Chionophilous calcicolous alpine grasslands of the Western Carpathians

- *Seslerion bielzii* Pawłowski 1935 (43)
- *Seslerion tatrae* Pawłowski 1956 (2b)

SES-01G *Festuco saxatilis-Seslerion bielzii* (Pawłowski et Walas 1949) Coldea 1984

Chionophilous calcicolous alpine grasslands of the Southern Carpathians

- *Festucion marmarossicae* Pawłowski et Walas 1949 (34a)
- *Seslerion bielzii calcophilum* Pop 1968 (34a)

PYRENEEAN-CANTABRIAN GROUP OF ALLIANCES

SES-01H *Primulion intricatae* Br.-Bl. ex Vigo 1972

Chionophilous meso-hygrophilous calcicolous grasslands on nutrient-rich soils in the subalpine and alpine belts of the Pyrenees

ses08 Peyre & Font (2011) suggested classifying this alliance within the *Carici-Kobresietea*. (LM)

- *Primulion intricatae* Br.-Bl. 1948 (3b)
- *Laserpitio nestleri-Ranunculion thorae* Vigo 1979 (2b)
- *Laserpitio nestleri-Ranunculion thorae* Vigo ex Molero 1981 (syntax.syn.)
- *Salicion pyrenaicae* Vigo ex Rivas-Mart. et al. 2002 (8)

SES-01I *Armerion cantabricae* Rivas-Mart. et al. 1984

Chionophilous subalpine and alpine calcicolous grasslands of the Cantabrian Mountains

SES-02 *Seslerietalia tenuifoliae* Horvat 1930

Montane to alpine calcicolous tussock grasslands of the Northern Balkans and the Apennines

- *Seslerietalia apenninae* Furnari et Bruno 1966 (syntax. syn.)
- *Seslerietalia apenninae* Lakušić 1968 (phantom)
- *Seslerietalia apenninae* Lakušić 1969 (2b)

SES-02A *Seslerion tenuifoliae* Horvat 1930

Montane and subalpine calcicolous blue-grass tussock grasslands of the Illyrian region and the Northern Dinarides

- *Edraianthion croatici* Lakušić et al. 1980 (phantom)
- *Edraianthion croatici* Lakušić et al. 1982 (2b)
- *Seslerio-Edraianthion pumili* Redžić 2003 (2b, 5)

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SES-02B *Seslerio juncifoliae-Caricion firmae* Trinajstić 2005

Alpine calcicolous sedge swards in wind-exposed habitats in the alpine belt of the Illyrian region and the Northern Dinarides

SES-02C *Festucion pungentis* Horvat 1930

Subalpine calcicolous tussock grasslands on steep terraced slopes of the Northern Dinarides

- *Festucion bosniacae* Horvat 1930 *nom. mut. propos.* (45)

ses09 The mutated name was proposed independently by both Redžić (2003, 2007) and Trinajstić (2008: 87). (LM)

SES-02D *Seslerion apenninae* Furnari in Bruno et Furnari 1966

Subalpine and alpine calcicolous tussock grasslands in wind-exposed habitats of the Central and Southern Apennines

- *Seslerion apenninae* Lakušić 1968 (phantom)
- *Seslerion apenninae* Lakušić 1969 (2b)

SES-03 *Onobrychido-Seslerietalia* Horvat 1960

Alpine and subalpine calcicolous tussock grasslands of the central and southern regions of the Balkan Peninsula

- *Onobrychido-Seslerietalia* Horvat 1949 (1)
- *Crepidetalia incarnatae* Lakušić 1964 (1)
- *Crepidetalia dinaricae* Lakušić 1964 (phantom)
- *Crepidetalia dinaricae* Lakušić 1966 (syntax.syn.)
- *Crepidetalia dinaricae* Lakušić 1968 (31)
- *Onobrychido-Seslerietalia* Horvat in Horvat et al. 1974 (31)
- *Oxytropidetalia dinaricae* Ohba 1974 (syntax.syn.)

ses10 Ohba (1974) described this order on basis of the *Oxytropidion dinaricae* Lakušić 1966 (*holotypus*) and classified it within the *Carici-Kobresietea*. This order was 'automatically' (see Ohba 1974: 382) typified by the '*Oxytropidion dinarici* Lakušić 1969' – a phantom name. Ohba (l.c.) cited the '*Edreantho-Seslerion* Horvat 1949' as synonym of the *Oxytropidion dinarici* Lakušić 1969. We consider the *Edraiantho-Seslerion* Horvat 1949 as synonym to the *Anthyllido-Seslerion klasterskyi* Simon 1958 (*Onobrychido-Seslerietalia, Elyno-Seslerietea*). (LM)

- *Edraiantho-Seslerietalia robustae* Redžić 2003 (2b, 5)

ALPINE GROUP OF ALLIANCES

SES-03A *Oxytropidion dinaricae* Lakušić 1966

Alpine tussock grasslands on limestone of the southwestern Dinarides

- *Oxytropidion dinaricae* Lakušić 1964 (phantom)
- *Oxytropidion urumovii* Lakušić 1966 *nom. mut. propos.* (*sensu* Redžić 2003) (*mut.illeg.*)
- *Oxytropidion dinaricae* Lakušić 1968 (31)
- *Oxytropidion dinaricae* Lakušić 1969 (phantom)
- *Oxytropidion dinaricae* Lakušić 1970 (31)
- *Edraianthion nivei* Lakušić et al. 1979 (2b, 5)
- *Oxytropidion dinaricae* Jovanović et al. 1986 (2b, 5)

SES-03B *Anthyllido-Seslerion klasterskyi* Simon 1958

Alpine tussock grasslands on limestone in mountains of the southern and central regions of the Balkan Peninsula

- *Edraiantho-Seslerion* Horvat 1949 (1)
- *Edraiantho-Seslerion* Horvat 1960 (syntax.syn.)
- *Anthyllido-Seslerion klasterskyi* Simon 1957 (phantom)

SUBALPINE GROUP OF ALLIANCES

SES-03C *Seslerio-Festucion xanthinae* Horvat in Horvat et al. 1974

Subalpine fescue grasslands on shallow skeletal soils over limestone of Eastern Serbia

- *Seslerio-Festucion xanthinae* Horvat 1949 (1)

SES-03D *Festuco-Knaution longifoliae* Jovanović-Dunjić 1955

Subalpine calcareous tussock grasslands on slightly acidic leached soils over limestone of Eastern Serbia

- *Festuco-Knaution longifoliae* Horvat 1949 (phantom)

SES-03E *Festucion xanthinae* Lakušić et al. 1969

Subalpine fescue grasslands on slightly acidic leached soils over limestone of the southwestern Dinarides

- *Festucion pseudoxanthinae* Lakušić et al. 1968 (phantom)
- *Festucion pseudoxanthinae* Lakušić et al. 1969 (2b)

SES-03F *Seslerion nitidae* Horvat 1936

Subalpine calcicolous tussock grasslands of the Southern and Central Balkans

- *Seslerion robustae* Horvat 1936 *nom. mut. propos.* (*sensu* Redžić 2003) (45)
- *Seslerion nitidae* Horvat 1937 (31)
- *Seslerion nitidae* Horvat 1954 (31)
- *Onobrychido-Festucion* Horvat 1960 (29)
- *Seslerion argenteae* Redžić 2003 (2b)
- *Seslerion rigidae-latifoliae* D. Lakušić et V. Ranđelović 1996 (2b, 3b, 5)

VEGETATION OF THE STEPPE ZONE

ZONAL STEPPE GRASSLANDS

FES *Festuco-Brometea* Br.-Bl. et Tx. ex Soó 1947

Dry grassland and steppe vegetation of mostly base- and colloid-rich soils in the submediterranean, nemoral and hemiboreal zones of Europe

fes01 The *Festuco-Brometea* is the class of zonal steppe vegetation of Southern Ukraine and Russia. In Central, Southern and Western Europe it is represented by extrazonal communities in relict habitats or (more often) as secondary grasslands (mainly pastures) on soils prone to desiccation or quick water drainage. (LM)

- *Festucetea ovinae* Knapp 1942 (1)
- *Festuco-Brometea* Br.-Bl. et Tx. ex Klika 1943 (2b)

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- *Festuco-Brometea* Br.-Bl. et Tx. ex Klika et Hadač 1944 (2b)
- *Festucetea ovinae* Knapp ex Westhoff et al. 1946 p.p. (2b)
- *Festuco-Brometea* Br.-Bl. et Tx. in Br.-Bl. 1949 (phantom)
- *Festuco-Brometea* Br.-Bl. et Tx. ex Br.-Bl. 1950 (31)
- *Festucetea ovinae* Knapp ex Wendelberger 1954 (syntax. syn.)
- *Brachypodio-Chrysopogonetea* Horvatić 1957 (2b)
- *Brachypodio-Chrysopogonetea* Horvatić 1963 (syntax.syn.)
- *Brachypodio-Brometea* Barbero et Loisel 1971 (syntax.syn.)
- *Helianthemo-Thymetea* Romashchenko et al. 1996 (syntax.syn.)
- *Armerio-Festucetea* Ubaldi 2003 (3g, 5)

GROUP OF ORDERS OF SUB-XERIC STEPPIC GRASSLANDS

FES-01 *Brachypodietalia pinnati* Korneck 1974 *nom. conserv. propos.*

Meso-xerophytic grasslands on deep calcareous soils of Western and Central Europe

fes02 If this name becomes conserved, the names *Brometalia erecti* Koch 1926 and *Brometalia erecti* Br.-Bl. 1936 would be formally rejected as *nomina ambigua* (see Remarks *fes03* and *fes04).* (JD)

- *Brometalia erecti* Koch 1926 *nom. ambig. rejic. propos.* (36)

fes03 We suggest rejecting the name '*Brometalia erecti* Koch 1926' and '*Brometalia erecti* Br.-Bl. 1936' as *nomina ambigua*. The *Brometalia erecti* was published for the first time by Koch (1926: 20) and included only one alliance, the *Bromion erecti* Koch 1926 that automatically becomes the *holotypus* of the order. The *Meso-Brometum erecti* Koch 1926 is the *holotypus* of the alliance because it the only association (documented by single relevé) classified within the *Bromion erecti* Koch 1926 in the original protologue. Braun-Blanquet (1936) used the same name (*Brometalia erecti*) illegitimately (ICPN art. 31) and classified the *Festucion valesiacae* and the *Bromion erecti* into this order. Since Braun-Blanquet (1936) made a bibliographic reference only to the *Festucion valesiacae* Klika 1931, this alliance becomes (following the ICPN art. 18) the *holotypus* of the *Brometalia erecti* Br.-Bl. 1936. Later, the name *Brometalia erecti* (mostly including 'Br.-Bl. 1936' as the author's citation) also included the syntaxonomic concepts of the *Meso-Bromion* and *Xero-Bromion* (e.g. Oberdorfer 1992; Pott 1995; Schubert et al. 2001) that are at variance with the protologue of the *Brometalia erecti* Br.-Bl. 1936 (typified by the *Festucion valesiacae*). Korneck (1974) described the *Brachypodietalia pinnati* whereto he classified the *Meso-Bromion*, whereas the *Xero-Bromion* remained linked to the '*Brometalia erecti* Br.-Bl. 1936' which reflects neither the spirit of the protologue by Koch (1926) nor that by Braun-Blanquet (1936). As a result, the names *Brometalia erecti* Koch 1926 and the *Brometalia erecti* Br.-Bl. 1936 underwent a history of erroneous interpretations and became misleading. See Dengler et al. (2003) for the published proposal of rejection of the name *Brometalia erecti* as a *nomen ambiguum.* (JD)

- *Brometalia* Br.-Bl. 1931 (2b)
- *Brometalia erecti* Br.-Bl. 1936 *nom. ambig. rejic. propos.* (36)

fes04 The proposal to reject this name as *nomen ambiguum* was presented by Dengler et al. (2003). (JD)

- *Trifolietalia montani* Krausch 1962 (2b, 3b)
- *Origano-Meso-Brometalia* Doing 1963
- *Leucanthemo vulgaris-Brometalia erecti* (Biondi et al. 1995) Ubaldi 1997 (phantom)

FES-01A *Bromion erecti* Koch 1926

Meso-xerophytic basiphilous grasslands of Western Europe and subatlantic Central Europe

- *Bromion erecti* Br.-Bl. 1931 (2b)
- *Bromion erecti* Br.-Bl. 1936 (31)
- *Meso-Festucion* Oberd. 1941 (1)
- *Mesobromion* Oberd. 1949 (2b)
- *Mesobromion* (Br.-Bl. et Moor 1938) Zoller 1954
- *Meso-Festucion* Oberd. in Krausch 1962 (2b)
- *Seslerio-Mesobromion* (Oberd. 1957) Theurillat in Theurillat et Béguin 1985 (syntax.syn.)

FES-01B *Cirsio-Brachypodion pinnati* Hadač et Klika in Klika et Hadač 1944

Meso-xerophytic basiphilous grasslands of the subcontinental regions of Central and southeastern Europe

- *Festucion sulcatae* de Soó 1929 (2b)
- *Festucion sulcatae* Soó 1938 (31)
- *Danthonio-Stipion stenophyllae* Ghişa 1947
- *Danthonio-Stipion stenophyllae* Soó 1947 (2b)
- *Danthonio-Stipion stenophyllae* Soó 1949 (syntax.syn)
- *Danthonio-Festucion sulcatae* Csűrös et al. 1961
- *Thymo comosi-Festucion sulcatae* Pop 1968 (syntax.syn.)
- *Thymo comosi-Festucion rupicolae* Pop 1968 *nom. mut. propos.* (*mut.superfl.*)
- *Danthonio-Brachypodion* Boşcaiu 1970
- *Danthonio-Stipion tirsae* Soó 1949 *corr.* 1971 (syntax.syn.)
- *Carici humilis-Bromion erecti* Redžić 1991 (1)
- *Cirsio acauli-Bromion erecti* Redžić 1991 (1)
- *Fragario viridis-Trifolion montani* Korotchenko et Didukh 1997 (syntax.syn.)

fes05 This alliance should be handled as a synonym of the *Festucion valesiacae*. (YD)

- *Cirsio acauli-Bromion erecti* Redžić 1999 (2b)
- *Carici humilis-Bromion erecti* Redžić 1999 (2b)

FES-01C *Filipendulo vulgaris-Helictotrichion pratensis* Dengler et Löbel in Dengler et al. 2003

Meso-xerophilous basiphilous grasslands of alvars of Fennoscandia and the southern seaboards of the Baltic Sea

- *Helianthemo-Globularion* Br.-Bl. 1963 *nom. dubium* p.p. (38)

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fes06 This name has been suggested for rejection as *nomen dubium* (see Dengler et al. 2003; Dengler & Löbel 2006). Braun-Blanquet (1963) described the *Helianthemo-Globularion* with only one association, the *Phleo phleoidis-Veronicetum spicatae* Br.-Bl. 1963. This association is considered a *nomen dubium* because due to the large plot size of all relevés of the original diagnosis, each contains a mosaic of the *Filipendulo vulgaris-Helictotrichion pratensis* (*Festuco-Brometea*) and the *Tortello tortuosae-Sedion albi* (*Sedo-Scleranthetea* or *Koelerio-Corynephoretea*, depending on the syntaxonomic interpretation of the latter two classes). In addition, the original relevés of the *Phleo phleoidis-Veronicetum spicatae* seem to be very incomplete (Krahulec et al. 1986; Dengler & Löbel in Dengler et al. 2003; Dengler & Löbel 2006). Following ICPN art. 37, an alliance of which the type association is considered to be *nomen dubium* is to be deemed *nomen dubium* as well, and hence invalid. Accordingly, the name *Helianthemo-Globularion* cannot be applied for any of the two alliances but has to be replaced by the next valid name instead. (JD, LM)

- *Anthyllido-Artemision campestris* Sunding 1963 (1)
- *Anthyllido-Artemision campestris* Sunding in Marker 1969 (3b)

FES-01D *Gentianello amarellae-Helictotrichion pratensis* Royer ex Dengler in Mucina et al. 2009

Meso-xerophytic basiphilous grasslands of northwestern Europe

- *Gentianello amarellae-Avenulion pratensis* Royer 1991 (3b)
- *Gentiano amarellae-Avenulion pratensis* Royer ex Julve 1993 (2b)

FES-01E *Potentillo-Brachypodion pinnati* Br.-Bl. 1967

Meso-xerophytic neutro-basiphilous grasslands in the montane belt of the Northern Spain mountain ranges and the Pyrenees

- *Festuco-Brachypodion pinnati* Nègre 1969 (syntax.syn.)
- *Centaureo nemoralis-Brachypodion pinnati* (Br.-Bl. 1967) Géhu et M. Costa 1974 (29)
- *Onobrychidion hispanicae* Royer 1991 (syntax.syn.)
- *Diantho monspessulani-Teucrion pyrenaici* Julve 1993 (3b)
- *Diantho monspessulani-Teucrion pyrenaici* Julve in Rameau et al. 1993 (2b, 3b)
- *Bromo erecti-Teucrion pyrenaici* Rivas-Mart., Fernández-González et Loidi in Loidi et al. 1997 (5)
- *Bromo erecti-Teucrion pyrenaici* Rivas-Mart. et M. Costa 1998 (5)
- *Teucrio pyrenaici-Bromion erecti* Rivas-Mart. et al. 1999 (syntax.syn.)

fes07 Rivas-Martínez et al. (1999: 388) classified this alliance within the *Ononidetalia striatae*. (LM)

- *Potentillo montanae-Brachypodion rupestris* Br.-Bl. 1967 *corr*. Rivas-Mart. et al. 2001 (43)

fes08 For the formal correction see Rivas-Martínez et al. (2002a: 240). (LM)

FES-01F *Polygalo mediterraneae-Bromion erecti* (Biondi et al. 2005) Di Pietro in Di Pietro et al. 2015

Dry grasslands on deep clay-rich soils over flysch bedrocks in the colline to lower montane belts of the Apennines

FES-01G *Chrysopogono-Danthonion calycinae* Kojić 1959

Dry grasslands on deep soils over siliceous bedrocks in the colline to submontane belts of the Southern and Central Balkans

- *Chrysopogono-Danthonion alpinae* Kojić 1959 *nom. mut. propos.* (45)
- *Chrysopogono-Danthonion calycinae* Kojić 1957 (3b)
- *Filipendulo-Danthonion* Redžić 2000 (2b, 5)

GROUP OF ORDERS OF CLOSED TUSSOCK STEPPES

FES-02 *Festucetalia valesiacae* Soó 1947

Steppes and rocky steppic grasslands on deep soils in the steppe and forest-steppe zones of Europe and northwestern Central Asia

- *Festucetalia valesiacae* Soó 1940 (2b)
- *Festucetalia valesiacae* Br.-Bl. et Tx. 1943 (2b)
- *Festucetalia valesiacae* Br.-Bl. et Tx. ex Br.-Bl. 1950 (31)

fes09 The validation of this name was effected by Braun-Blanquet in 1950 (not in 1949 as frequently assumed in the literature) by the publication of the reference list in the last part of Braun-Blanquet's series on Rhaetian communities. (JD)

- *Artemisio-Bassietalia prostratae* Lendvai et Borhidi in Borhidi et al. 2012 (syntax.syn.)
- *Koelerio-Phleetalia phleoidis* Korneck 1974 (syntax.syn.)

POST-GLACIAL GROUP OF STEPPE ALLIANCES

FES-02A *Festucion valesiacae* Klika 1931 *nom. conserv. propos.*

Steppe fescue grasslands on deep calcareous soils of subcontinental Central Europe, Romania, Bulgaria and northwestern Ukraine

fes10 We suggest conserving this name against the older '*Festucion sulcatae* Soó 1930' that we suggest for rejection as a *nomen ambiguum*. (LM, MC)

- *Festucion sulcatae* Soó 1930 *nom. ambig. rejic. propos.* (36)

fes11 Following the protologue, the *Festucion sulcatae* (Soó 1930) alliance clearly corresponds to the *Festucion valesiacae* (xeric communities). However, the same author later (Soó 1947) used this name exclusively for meso-xeric communities (today classified within the *Cirsio-Brachypodion*). This deed causes potential confusion that would be mitigated by rejecting the '*Festucion sulcatae* Soó 1930' as *nomen ambiguum*. (LM, JD)

- *Caricion humilis-albae* Gams 1936 (2b)
- *Festucion rupicolae* Soó 1940 *nom. mut. propos.* (*mut. superfl.*)
- *Festucion vallesiacae-sulcatae* Eggler 1942 (orig.form) (1)
- *Eu-Festucion valesiacae* Br.-Bl. et Tx. 1943 (2b)
- *Astragalo-Stipion* Knapp 1944 (1)

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- *Festucion vallesiacae-sulcatae* Eggler 1952 (orig.form) (2b)
- *Festuco-Stipion* Krausch 1959 (2b)
- *Festuco-Stipion* (Klika 1931) Krausch 1962 (29)
- *Achillion nobilis* Smetana, Derpolyuk et Krasova 1997 (orig.form) (2b, 5)
- *Elytrigion stipifoliae* Krasova et Smetana 1999 (syntax. syn.)
- *Verbasco austriaci-Achilleion nobilis* Smetana et Derbolyuk 1999 (2b)
- *Poo angustifoliae-Stipion capillatae* Goncharenko 2003 (5)
- *Tanaceto millefolii-Galatellion villosae* Vynokurov 2014 (2b, 3b, 5)
- *Tanaceto millefolii-Galatellion villosae* Vynokurov 2015 (2b, 3b, 5)

FES-02B *Koelerio-Phleion phleoidis* Korneck 1974

Steppic silicicolous grasslands of the subatlantic and subcontinental regions of the temperate Europe

FES-02C *Stipion lessingianae* Soó 1947

Dry feather-grass and fescue steppes on deep soils of Transsylvania, Moldova and southwestern Ukraine

- *Ceratocarpo-Euphorbion stepposae* Mititelu 1970
- *Jurineo arachnoideae-Euphorbion stepposae* (Dobrescu 1971) Coldea et Sărbu in Coldea 2012 (syntax.syn.)
- *Marrubio praecocis-Stipion lessingianae* Vynokurov 2014 (2b, 5)
- *Stipo lessingianae-Marrubion praecocis* Vynokurov 2014 (2c)
- *Stipo lessingianae-Salvion nutantis* Vynokurov 2014 (syntax.syn.)

FES-02D *Centaureo carbonatae-Koelerion talievii* Romashchenko et al. 1996

Steppe fescue grasslands on deep calcareous soils of continental northeastern Ukraine and adjacent Russia

FES-02E *Adonido vernalis-Stipion tirsae* Didukh in Didukh et Mucina 2014

Steppic dwarf-scrub grasslands at low altitudes of Eastern Crimea

- *Adonido vernalis-Stipion tirsae* Didukh 1983 (2b, 5)

FES-02F *Veronico multifidae-Stipion ponticae* Didukh in Didukh et Mucina 2014

Steppic dwarf-scrub rich grasslands of the northern piedmonts of the mountain ranges of southeastern and central regions of Crimea

- *Veronico multifidae-Stipion ponticae* Didukh 1983 (2b, 5)

FES-02G *Artemisio tauricae-Festucion* Korzhenevsky et Klyukin 1991

Steppes on clayey volcanic sediments of Southern Ukraine

- *Poo angustifoliae-Ferulion orientale* V. Solomakha et al. 2005 (syntax.syn.)

FES-02H *Agropyrion pectinati* Golub et Uzhametskaya 1991

Subsaline steppic grasslands of the Middle Volga region

RELICT TARDIGLACIAL STEPPE GROUP OF ALLIANCES

FES-02I *Artemisio-Kochion* Soó 1964

Relict tardiglacial xerophytic loess steppes of the Pannonian region

fes12 This alliance would perhaps be better placed in the *Agropyretalia intermedio-repentis*. (KD)

- *Agropyro-Kochion* Soó 1959 (3b)

FES-02J *Stipo-Poion xerophilae* Br.-Bl. et Richard 1950

Relict tardiglacial xerophytic fescue and feather steppic rocky grasslands of deep intramontane valleys of the Alps

- *Stipo-Poion molinerii* Br.-Bl. et Tx. ex Br.-Bl. 1949 *nom. mut. propos.* (45)
- *Poo-Festucion vallesiacae* Knapp 1942 (1)
- *Astragalo-Poion concinnae* Br.-Bl. et Tx. 1943 (2b)
- *Stipo-Poion xerophilae* Br.-Bl. et Tx. 1943 (2b)
- *Stipo-Poion xerophilae* Br.-Bl. et Tx. ex Br.-Bl. 1949 (2b)
- *Astragalo onobrychidis-Poion concinnae* Br.-Bl. et Richard 1950 (syntax.syn.)
- *Stipo-Poion concinnae* Br.-Bl. et Richard 1950 (syntax. syn.)
- *Stipo-Poion xerophilae* Br.-Bl. et Tx. ex Br.-Bl. 1950 (syntax.syn.)
- *Stipo-Poion carniolicae* Br.-Bl. 1961 (syntax.syn.)
- *Stipo-Poion perconcinnae* Br.-Bl. 1961 *corr.* Julve 1993 (43)

FES-03 *Helictotricho desertorum-Stipetalia* Toman 1969

Continental subxeric temperate grasslands in the steppe zone of the Volga River valley, the Southern Urals and Northern Kazakhstan

- *Onosmetalia simplicissimae* Mirkin et Saitov in Saitov 1989 (1)

FES-03A *Helictotricho desertorum-Stipion rubentis* Toman 1969

Continental subxeric steppes of Northern Kazakhstan and the Southern Urals

- *Galio-Onosmion simplicissimae* Saitov 1989 (1)
- *Orostachyion spinosae* Saitov 1989 (1)
- *Galio-Onosmion simplicissimae* Saitov in Saitov et Mirkin 1996 (2b, 5)
- *Orostachyion spinosae* Saitov in Saitov et Mirkin 1996 (2b, 5)

FES-03B *Scorzonero austriacae-Koelerion sclerophyllae* Solomeshch et al. 1994

Dry steppes on shallow rocky soils on steep slopes in the steppe zone of the Southern Urals

FES-03C *Lathyro pallescentis-Helictotrichion schelliani* Solomeshch et al. 1994

Mesic steppes on fertile deep soils on gentle slopes in the steppe zone of the Southern Urals

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FES-03D *Aconopogonion alpini* Yamalov et al. 2009 *nom. inval.* (2b)

Extrazonal insular steppes in the boreal forest zone at higher altitudes of the Southern Urals

- *Aconopogonion alpini* Yamalov et Mirkin 2010 (2b, 3b, 5)
- *Aconopogonion alpini* Yamalov et Zhirnova in Yamalov et al. 2012 (2b, 3b, 5)

FES-03E *Centaureion sumensis* Golub et al. 1995

Continental relict rocky steppes of the Middle Volga River valley

- *Centaureion sumensis* Golub et Uzhametskaya 1992 (1)

FES-04 *Tanaceto achilleifolii-Stipetalia lessingianae* Lysenko et Mucina *ordo nov. hoc loco*

Continental temperate dry steppe grasslands of the semi-desert transitional zone of the Don, Lower Volga and Ural River valleys and Northern Kazakhstan

fes13 So far, the Eurasian continental steppes were classified within two orders, the *Festucetalia valesiacae* and the *Helictotricho-Stipetalia*. The dry steppes showing transitional character towards semi-desert vegetation of southwestern Europe and Northern Kazakhstan remained a syntaxonomic problem until Royer (1991: 29–31) described *Tanaceto-Stipenalia lessingianae nom. inval.* (suborder) and classified this syntaxon within the *Helictotricho-Stipetalia* Toman 1969. We consider this vegetation (based on our preliminary syntaxonomic synthesis – Lysenko & Mucina, in prep.) as vegetation deserving the rank of an order that we describe here formally by designating the *Tanaceto achilleifolii-Stipion lessingianae* (see Remark *fes14* below) as the *holotypus (hoc loco)* of the new order. Diagnostic species of the new order are: *Artemisia lerchiana, A. santonica, Bassia prostrata, Koeleria macrantha, Stipa korshinskyi, S. lessingiana, S. sareptana, Tanacetum achilleifolium* and *T. santolina.* (TL, LM)

- *Tanaceto-Stipetalia lessingianae* Lysenko 2014 (2b, 5, 8)

FES-04A *Tanaceto achilleifolii-Stipion lessingianae* Royer ex Lysenko et Mucina *all. nov. hoc loco*

Continental temperate dry steppe grasslands of the transitional steppe to desert zone of the Don, Volga and Ural River valleys

fes14 Herein we validate the *Tanaceto-Stipion lessingianae* invalidly described by Royer (1991: 29–31) since the type association (*Artemisio incanae-Stipetum lessingianae*, see pp. 189 and 207) is a *nomen nudum*. This alliance comprises continental temperate steppe grasslands of the transitional region spanning dry steppe and semi-desert subzones in the Don, Volga and Ural River basins. This alliance is conceptually identical with the *Tanaceto achilleifolii-Artemision santonicae,* invalidly described by O. Demina (Demina et al. 2012: 77; Demina 2015: 172). The syntaxonomic revision of the *Tanaceto achilleifolii-Stipion lessingianae* is in progress (Lysenko & Mucina, in prep.). The diagnostic species of the alliance are: *Galatella tatarica, Stipa lessingiana, Stipa sareptana, Tanacetum achilleifolium* and *T. santolina.* We describe a new association, the *Tanaceto achilleifolii-Stipion lessingianae* association, the *Tanaceto achilleifolii-Stipetum lessingianae* Lysenko et Kalmykova *ass. nov. hoc loco* and present the following *holotypus (hoc loco)* of the new association that will be handled in detail at a later stage. Russian Federation, Saratov Region, Voskresensk district, outskirts of Slavyanka, sampled area: 100 m^2, vegetation cover: 80%; 8 July 2005; relevé made by T. Lysenko: *Stipa lessingiana* 4, *Achillea nobilis* 2, *Elytrigia repens* 2, *Galatella villosa* 2, *Stipa capillata* 2, *Allium flavescens* 1, *Artemisia austriaca* 1, *A. nitrosa* 1, *Bassia prostrata* 1, *Falcaria vulgaris* 1, *Gypsophila muralis* 1, *Pastinaca sativa* 1, *Potentilla argentea* 1, *Silene chlorantha* 1, *Tanacetum achilleifolium* 1, *Dianthus borbasii* +, *Ferula tatarica* +, *Galium verum* +, *Medicago falcata* +, *Spiraea hypericifolia* +, *Trinia multicaulis* +. This association is *holotypus (hoc loco)* of the *Tanaceto achilleifolii-Stipion lessingianae.* (TL, LM)

- *Tanaceto achilleifolii-Stipion lessingianae* Royer 1991 (2b, 5)
- *Tanaceto achilleifolii-Artemision santonicae* Demina 2011 (2b, 3b)
- *Tanaceto achilleifolii-Artemision santonicae* Demina et al. 2012 (2b, 3b)
- *Tanaceto-Stipion lessingianae* Lysenko 2014 (2b, 5, 8)
- *Tanaceto achilleifolii-Artemision santonicae* Demina 2015 (5)

FES-04B *Stipion korshinskyi* Toman 1969

Continental temperate dry steppe grasslands of the semi-desert zone of northwestern Kazakhstan and the neighbouring regions of Russia

FES-04C *Caricion stenophyllae* Golub et Saveleva 1991

Continental temperate subsaline steppe grasslands around lakes in the semi-desert zone of the Lower Volga River valley

- *Poo bulbosae-Caricion stenophyllae* Saitov 1986 (1)
- *Poo bulbosae-Caricion stenophyllae* Saitov in Saitov et Mirkin 1996 (2b, 5)

GROUP OF ORDERS OF ROCKY STEPPIC GRASSLANDS

FES-05 *Stipo pulcherrimae-Festucetalia pallentis* Pop 1968 *nom. conserv. propos.*

Xerophilous open steppic grasslands on shallow rocky calcareous and siliceous substrates of Central and southeastern Europe

fes15 I suggest to conserve the name *Stipo pulcherrimae-Festucetalia pallentis* Pop 196 against validly published *Seslerietalia rigidae* Gergely 1967 because the latter name has been in use only in Romania literature, while the former has been widely (and more frequently) use in many countries of Central and Eastern Europe. (LM)

- *Seslerietalia rigidae* Gergely 1967 *nom. rejic. propos.* (36)
- *Bromopsietalia cappadocicae* Didukh in Saitov et Mirkin 1991 (2b, 5)
- *Stipo eriocaulis-Festucetalia pallentis* Pop (1968) 1991 (29a)
- *Bromopsietalia cappadocicae* Saitov et Mirkin 1996 (2b, 5)

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SILICICOLOUS GROUP OF ALLIANCES

FES-05A *Alysso-Festucion pallentis* Moravec in Holub et al. 1967

Xerophilous steppic grasslands on shallow soils over siliceous and ultramafic rocks as well as Silurian limestones of the Hercynicum

- *Asplenio cuneifolii-Festucion glaucae* Ernst 1974 (phantom)
- *Polytricho piliferi-Festucion cinereae* Schubert 1974 (syntax. syn.)
- *Helianthemo cani-Festucion pallentis* Kolbek in Moravec et al. 1983 (syntax.syn.)

fes16 MC does not support the concept of this alliance and prefers to include it within the *Alysso-Festucion pallentis*. The basic-acidic gradient in Bohemia, from where this alliance was described, is continuous, as there are basalts and similar volcanic rocks with chemistry and physical properties not very different from Silurian-Devonian limestones and calcareous shales. J. Klika in his classical works (1933 and others) included relevés from Central Bohemian limestones and volcanic rocks to the same associations, because he observed high similarity in floristic composition. The original diagnosis of the *Alysso-Festucion pallentis* also includes vegetation from basic igneous rocks, not only from strongly acidic rocks, which indicates that a single alliance for the xerophilous rocky grasslands in Bohemia and the adjacent areas of the Hercynicum is sufficient. (MC)

- *Asplenio cuneifolii-Armerion serpentini* Kolbek et al. 1983 (5)
- *Asplenio cuneifolii-Armerion serpentini* Kolbek et al. ex Mucina et Kolbek 1993 (syntax.syn.)
- *Polytricho piliferi-Festucion pallentis* Schubert 1974 *corr.* Schubert et al. 2001 (43)

FES-05B *Asplenio-Festucion pallentis* Zólyomi 1936 *corr.* 1966

Xerophilous rocky steppic grasslands on shallow soils over siliceous and ultramafic rocks of the Eastern Alps and northern fringes of the Pannonian Basin

- *Asplenio-Festucion glaucae* Zólyomi 1936 (43)
- *Asplenion serpentini* Soó 1959 (31)
- *Asplenion serpentini (forsteri)* Soó 1969 (orig.form) (2b)
- *Asplenio-Festucion pallentis* Zólyomi 1936 *corr.* Soó 1980 (*corr.superfl.*)
- *Avenulo adsurgentis-Festucion pallentis* Mucina in Mucina et Kolbek 1993 (syntax.syn.)

CALCAREOUS GROUP OF ALLIANCES

FES-05C *Bromo pannonici-Festucion csikhegyensis* Zólyomi 1966 *corr.* Mucina in Di Pietro et al. 2015

Xerophilous rocky steppic grasslands on calcareous substrates of the northern fringes of the Pannonian Basin and the Ukrainian Podolya

fes17 This alliance is typified by the *Seselio leucospermi-Festucetum glaucae* Zólyomi 1936 *corr.* 1966 (see Mucina & Kolbek 1993a), described from Northern Hungarian colline dolomite landscapes. The latest taxonomic studies of the genus *Festuca* (Šmarda et al. 2007) suggest that the tetraploid '*Festuca pallens*' in this region is actually *Festuca csikhegyensis* Simonk., a taxonomically different concept from the diploid *F. pallens* Host. This fact underpins the necessity of the name correction as presented in Di Pietro et al. (2015). (LM)

- *Seslerio-Festucion glaucae* Klika 1931 *nom. ambig. rejic. propos.* (36)

fes18 Mucina & Kolbek (1993a: 460–461; see also Theurillat 1997) suggested rejecting the name '*Seslerio-Festucion glaucae*' (and consequently all its 'corrected' and 'mutated' variants, such as *Seslerio-Festucion pallentis sensu auct.* and *Seslerio-Festucion duriusculae sensu auct.*) as *nomina ambigua*. In case the names *Seslerio-Festucion glaucae*, *Seslerio-Festucion pallentis*, and *Seslerio-Festucion duriusculae* would be rejected as *nomina ambigua* and the name *Bromo pannonici-Festucion csikhegyensis* Zólyomi 1966 *corr*. Mucina in Di Pietro et al. 2015 (see above) should be conserved as the valid name for this syntaxon. (LM)

- *Seslerio-Festucion duriusculae* Klika 1931 *nom. mut. propos.* et *nom. ambig. rejic. propos.* (36, *mut.superfl.*)

fes19 See Remark *fes17.* (LM)

- *Seslerio-Festucion pallentis* Klika 1931 *corr*. Zólyomi 1966 *nom. ambig. rejic. propos.* (36, *corr.superfl.*)

fes20 See Remark *fes17.* (LM)

- *Bromo-Festucion pallentis* Zólyomi 1966 (43)
- *Festucion pallentis* (Klika 1931) Korneck 1974 p.p. *nom. dubium* (38)

fes21 Korneck (1974) introduced the name '*Festucion pallentis*' by renaming the *Seslerio-Festucion glaucae* Klika 1931; he also expanded the ecological space occupied by the latter by adding *Festuca*-dominated rocky grasslands over siliceous. Korneck's (l.c.) syntaxonomic concept defies ecological and phytogeographic logic as it comprises basically all *Festuca pallens*-dominated communities, including those on calcareous, siliceous and ultramafic substrates; these differ widely in floristic composition as well as in assembly genesis. Korneck's (l.c.) concept brings further confusion into the intricate nomenclature matters surrounding the *Festuca pallens*-communities in Western and Central Europe and therefore should be considered not only *nomen superfluum* but also *nomen dubium*. (LM)

- *Galio campanulatae-Poion versicoloris* Kukovitsa et al. 1994 (2b, 5)

FES-05D *Chrysopogono-Festucion dalmaticae* Borhidi 1996

Xerophilous rocky steppic grasslands on calcareous substrates of the southern fringes of the Pannonian Basin

- *Koelerio-Festucion dalmaticae* N. Ranđelović et Ružić 1983 (2b, 5)
- *Chrysopogono-Festucion pseudodalmaticae* Coldea et Sărbu in Coldea 2012 (29)

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FES-05E *Saturejion montanae* Horvat in Horvat et al. 1974

Xerophilous rocky steppic grasslands on calcareous substrates of the Northern Balkans

- *Saturejion kitaibelii* N. Ranđelović et V. Ranđelović in Milosavljević et al. 2008 (2b)

FES-05F *Pimpinello-Thymion zygoidi* Dihoru et Doniţa 1970

Xerophilous rocky steppic dwarf-shrub rich grasslands on steep calcareous slopes of Dobrogea and northeastern Bulgaria

FES-05G *Potentillo arenariae-Linion czernjajevii* Krasova et Smetana 1999

Xerophilous rocky steppic species-rich grasslands on limestone outcrops of Southern Ukraine

FES-05H *Androsaco tauricae-Caricion humilis* Didukh in Mucina et Didukh 2014

Xerophilous rocky steppic grasslands in the submontane and montane belts of Eastern Crimea

- *Carici humilis-Androsacion tauricae* Didukh 1983 (2b, 5)

DEALPINE RELICT GROUP OF ALLIANCES

FES-05I *Diantho lumnitzeri-Seslerion* (Soó 1971) Chytrý et Mucina in Mucina et Kolbek 1993

Dealpine relict xerophilous steppic grasslands on calcareous substrates of southeastern Central Europe

FES-05J *Seslerion rigidae* Zólyomi 1936

Dealpine relict xerophilous steppic grasslands on calcareous substrates of the Eastern Carpathians

- *Seslerion rigidae-latifoliae* D. Lakušić 1989 (1)

FES-06 *Thymo cretacei-Hyssopetalia cretacei* Didukh 1989

Xerophilous rocky dwarf-shrub rich steppic grasslands on chalk outcrops of the southwestern Central Russian Upland

FES-06A *Artemisio hololeucae-Hyssopion cretacei* Romashchenko et al. 1996

- *Xerophilous rocky dwarf-shrub rich steppic grasslands on steep eroding chalk outcrops of the southern regions of the Central Russian Upland*
- *Sileno supinae-Artemision hololeucae* Didukh 1989 (syntax. syn.)

FES-06B *Euphorbio cretophilae-Thymion cretacei* Didukh 1989

Xerophilous rocky dwarf-shrub rich steppic grasslands rich on chalk outcrops of the southern regions of the Siverskii Donets River valley

GROUP OF SUBMEDITERRANEAN ORDERS

FES-07 *Brachypodietalia phoenicoidis* Br.-Bl. ex Molinier 1934

Submediterranean steppic grasslands on deep basic to neutral mesic soils of precipitation-rich regions of southwestern Europe

fes22 Bardat et al. (2004) classified this order in the '*Thero-Brachypodietea ramosi*'. (LM) According to Royer (1991: 16) this order belongs to the '*Thero-Brachypodietea*' because it is only weakly linked to the *Festuco-Brometea*. Julve (1993), on the other hand, suggested the classification of this order within the *Dactylido hispanicae-Brachypodietea retusi*. (JPT)

- *Brachypodietalia phoenicoidis* Br.-Bl. 1931 (2b)
- *Centaureo-Brachypodietalia phoenicoidis* Rivas Goday et Rivas-Mart. 1963 (2b)
- *Brachypodio-Brometalia* Barbero et Loisel 1972 (27, 29c)

FES-07A *Brachypodion phoenicoidis* Br.-Bl. ex Molinier 1934

Submediterranean neutro-basiphilous steppic grasslands on deep mesic soils of the Ligurian and Tyrrhenian seaboards

- *Brachypodion phoenicoidis* Br.-Bl. 1931 (2b)

FES-07B *Artemisio albae-Dichanthion ischaemi* X. Font ex Rivas-Mart. et M.L. López in Rivas-Mart. et al. 2002

Submediterranean submontane and montane acidophilous steppic grasslands of the piedmonts and intramontane valleys of the Pyrenees

fes23 The *Artemisio-Dichantion* should be classified within the *Artemisio-Brometalia* (where, in the future, it might be reduced to synonymy). (JD)

- *Xerobromion acidophile* X. Font 1989 (34a)
- *Xerobromion thermofile* X. Font 1989 (34a)
- *Artemisio albae-Dichanthion ischaemi* X. Font in Rivas-Mart. et al. 2001 (2b)

FES-07C *Diplachnion serotinae* Br.-Bl. 1961

Submediterranean submontane acidophilous steppic grasslands of the precipitation-rich Insubrian southern rims of the Alps

FES-08 *Artemisio albae-Brometalia erecti* Ubaldi ex Dengler et Mucina in Mucina et al. 2009

Meso-xerophytic basiphilous open grasslands of subatlantic and submediterranean Europe

- *Xerobrometalia* Doing 1963 (2b)
- *Astragalo-Festucetalia* Barbero et Loisel 1972 (orig.form) (corresp.; as suballiance)
- *Xero-Brometalia erecti* Royer ex Dengler 1994 (8)
- *Artemisio albae-Brometalia erecti* (Biondi et al. 1995) Ubaldi 1997 (5)

FES-08A *Xerobromion erecti* (Br.-Bl. et Moor 1938) Zoller 1954

Meso-xerophytic basiphilous open grasslands of southwestern Central Europe and France

- *Koelerio-Xerobromion* Doing 1963 (2b)
- *Xerobromion* (Br.-Bl. et Moor 1938) Moravec in Holub et al. 1967 (syntax.syn.)
- *Seslerio-Xerobromion* (Oberd. 1957) Richards 1975 (syntax.syn.)
- *Seslerio-Xerobromion* (Oberd. 1957) Pott 1995 (31)

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FES-08B *Festuco-Bromion* Barbero et Loisel 1972
Meso-xerophytic basiphilous open grasslands of the submediterranean regions of Provence and Liguria
- *Bothriochloo ischaemi-Bromion erecti* Ubaldi 1977 (syntax.syn.)
- *Filipendulo vulgaris-Bromion erecti* Ubaldi 2011 (syntax. syn.)
- *Coronillo minimae-Astragalion monspessulani* Ubaldi 2003 (syntax.syn.)

FES-09 *Scorzoneretalia villosae* Kovačević 1959
Amphiadriatic dry steppic submediterranean pastures of the Prealpine, Illyrian and Dinaric regions
- *Scorzonero villosae-Chrysopogonetalia grylli* Horvatić et Horvat in Horvatić 1957 (2b)
- *Scorzonero villosae-Chrysopogonetalia grylli* Horvatić et Horvat in Horvatić 1958 (2b)
- *Scorzonero villosae-Chrysopogonetalia grylli* Horvatić et Horvat in Horvatić 1963 (syntax.syn)
- *Brachypodio-Chrysopogonetalia* (Horvatić et Horvat in Horvatić 1958) Boşcaiu 1972 (29)
- *Koelerietalia splendentis* Horvatić 1973 (syntax.syn.)
- *Koelerietalia splendentis* Horvatić 1975 (29)
- *Scorzoneretalia villosae* Horvatić 1973 (3m)
- *Scorzoneretalia villosae* Horvatić 1975 (3m)

FES-09A *Chrysopogono grylli-Koelerion splendentis* Horvatić 1973
Illyrian submediterranean rocky grasslands on shallow calcareous soils
- *Chrysopogono-Saturejion subspicatae* Horvat et Horvatić 1934 (3f)
- *Chrysopogono grylli-Saturejion subspicatae* Horvat et Horvatić ex Černjavski, Grebenščikov et Pavlović 1949 (*sensu* Terzi 2015) (2b)
- *Chrysopogono grylli-Saturejion subspicatae* Horvat et Horvatić in Horvat et al. 1974 (29c)
- *Peucedanion neumeyeri* (Ritter-Studnička 1967) Lakušić 1978 (syntax.syn.)
- *Festucion illyricae* (Horvat 1962) Trinajstić 2000 (8)
- *Koelerion pyramidatae* Redžić 2000 (2b)
- *Festucion illyricae* (Horvat) Ritter (orig.form; *sensu* Antonić & Lovrić 1986) (phantom)

FES-09B *Saturejion subspicatae* Tomić-Stanković 1970
Dinaric submediterranean montane calcareous rocky grasslands on shallow soils
- *Saturejion subspicatae* Horvat 1962 (3f)
- *Saturejion subspicatae* Horvat ex Horvatić 1973 (3f)
- *Saturejion subspicatae* Horvatić 1975 (31)
- *Saturejo subspicatae-Caricion humilis* (Horvat 1962) Trinajstić 1999 (29c)

FES-09C *Centaureion dichroanthae* Pignatti 1952
Prealpic submediterranean montane calcareous rocky grasslands on shallow soils
- *Centaureion dichroanthae* Pignatti 1953 (31)

FES-09D *Scorzonerion villosae* Horvatić ex Kovačević 1959
Prealpic and Illyrian meso-xerophytic submediterranean grasslands on deep and partly decalcified soils
- *Scorzonerion villosae* Horvatić 1949 (2b)
- *Scorzonerion villosae* Horvatić 1957 (2b)
- *Scorzonerion villosae* Horvatić 1963 (31)
- *Hypochaeridion maculatae* Horvatić 1973 (3f)
- *Hypochaeridion maculatae* Horvatić 1975 (3f)
- *Hypochaeridion maculatae* Horvatić in Royer 1991 (5)
- *Hypochaeridion maculatae* Horvatić ex Terzi 2011 (syntax.syn.)

FES-09E *Hippocrepido glaucae-Stipion austroitalicae* Forte et Terzi in Forte et al. 2005
Submediterranean xeric pastures on rocky calcareous soils of Apulia (Southern Italy)
fes24 The classification of this alliance within the *Scorzoneretalia villosae* is only tentative, pending further syntaxonomic analyses. (LM, M.Terzi)

FES-10 *Astragalo onobrychidis-Potentilletalia* Micevski 1971
Dry submediterranean montane steppic grasslands on calcareous substrates of the Southern Balkans
- *Astragalo-Potentilletalia* Micevski 1970 (2b)

FES-10A *Saturejo-Thymion* Micevski 1971
Dry submediterranean montane steppic grasslands on calcareous substrates of the Southern Balkans
- *Saturejo-Thymion* Micevski 1970 (phantom)

ULTRAMAFIC ORDER

FES-11 *Halacsyetalia sendtneri* Ritter-Studnička 1970
Ultramafic and silicicolous xeric rocky grasslands in the submontane to supramontane belts of the continental regions of the Balkan Peninsula
fes25 JD considers this order as weakly separated and heterogeneous.

FES-11A *Polygonion albanicae* Ritter-Studnička 1970
Ultramafic xeric rocky grasslands of Bosnia
fes26 The separation of the central and eastern Bosnian ultramafic rocky steppic grasslands into two validly described alliances (*Polygonion albanicae* and *Potentillion visianii*) is not supported by Ritter-Studnička's (1970) own data. We prefer to unite these two concepts and choose the name *Polygonion albanici* for the united concept since this name has already been used, for instance by Jovanović et al. (1986: 33). (LM, AC)
- *Potentillion visianii* Ritter-Studnička 1970 (syntax.syn.)

FES-11B *Centaureo-Bromion fibrosi* Blečić et al. 1969
Ultramafic xeric rocky grasslands of Kosovo, Serbia, Northern Macedonia and Albania

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FES-11C *Alyssion heldreichii* Bergmeier et al. 2009
Ultramafic xeric rocky grasslands of Northern Hellas and Southern Macedonia

INTRAZONAL SALINE VEGETATION OF THE STEPPE ZONE

FEP *Festuco-Puccinellietea* Soó ex Vicherek 1973
Saline steppes and secondary saline steppic grasslands of the continental regions of Europe
fep01 The *Festuco-Puccinellietea* in our system comprises two groups of orders: (1) those characteristic of habitats with hypersaline (mainly solonetz) dry soils (the relict *Puccinellietalia* and *Halo-Agropyretalia* steppic *Festuco-Limonietalia* and the semi-desertic *Artemisietalia pauciflorae*), and (2) those typical of flooded, moist/wet (mainly solonchak) soils (*Scorzonero-Juncetalia, Cirsietalia esculenti* and *Glycyrrhizetalia*). The latter group matches the syntaxonomic concepts of the *Scorzonero-Juncetea* and *Glycyrrhizetea,* if we follow selected Russian and Ukrainian authors (Golub 1995 and Solomakha 2008; but see Golub 1997 and Dubyna et al. 2007). (LM)
- *Puccinellio-Salicornietea* Ţopa 1939 p.p. (3f)
- *Festuco-Puccinellietea* Soó 1968 (2b)
- *Festuco-Limonietea* Karpov et Mirkin 1985 (2b, 5)
- *Festuco-Limonietea* Karpov et Mirkin ex Golub et V. Solomakha 1988 (2b)
- *Glycyrrhizetea glabrae* Golub et Mirkin in Golub 1995 (syntax.syn.)
- *Scorzonero-Juncetea gerardi* Golub et al. 2001 (syntax. syn.)

FEP-01 *Puccinellietalia* Soó 1947
Meso-xerophytic saline pastures in the subcontinental and submediterranean zones of the southern regions of Central and Southern Europe
- *Puccinellietalia* Soó 1933 (2b)
- *Coeno-Puccinellietalia* Chapman 1959 p.p. (2b)
- *Staticetalia* Chapman 1959 p.p. (2b)
- *Artemisio-Festucetalia pseudovinae* Soó 1968 (29)
- *Festuco-Puccinellietalia* Soó 1968 (29)
- *Puccinellietalia distantis/limosae* (Soó 1968) Géhu et Rivas-Mart. 1982 (29)
- *Puccinellietalia limosae* Soó 1947 *corr*. Géhu et Géhu-Franck 1992 (*corr.superfl.*)

FEP-01A *Festucion pseudovinae* Soó 1933
Pontic-Pannonian saline steppic pastures on solonetz soils
- *Puccinellio-Staticion gmelinii* Ţopa 1938 (phantom)
- *Puccinellio-Staticion gmelinii* Ţopa 1939 (syntax.syn.)
- *Statici-Artemision* Ţopa 1939 (phantom)
- *Artemision maritimi* Chapman 1959 p.p. (2b)
- *Coeno-Artemision* Chapman 1959 (3d)
- *Staticion gmelinii* Chapman 1959 (2b)
- *Festucion pseudovinae* Borza et Boşcaiu 1965 (2b)
- *Inulo-Festucion pseudovinae* Vicherek 1973 (syntax.syn.)

FEP-01B *Peucedano officinalis-Asterion sedifolii* Borhidi 1996
Pannonian tall-forb rich subsaline meadows on calcareous loess soils

FEP-01C *Puccinellion limosae* Soó 1933
Pannonian hypersaline open grasslands on solonetz soils
- *Puccinellion* Klika and Vlach 1937 (31)
- *Puccinellion limosae* (Klika and Vlach 1937) Wendelberger 1943 (31)
- *Puccinellion salinariae* Wendelberger 1943 (syntax.syn.)
- *Puccinellion distantis* Knapp 1948 (phantom)
- *Puccinellion peisonis* Wendelberger 1943 *corr*. Soó 1957 (31)
- *Eco-Puccinellion* Chapman 1959 p.p. (3d)
- *Tripolio-Puccinellion distantis* Golub et V. Solomakha 1988 (2b)

FEP-01D *Puccinellion convolutae* Micevski 1965
Macedonian and Northern Aegean relict saline grasslands on edges of inland salt pans
fep02 Golub et al. (2005: 70) attempted to discredit the concept of the *Puccinellion convolutae* Mitsevski 1965 by declaring it a *nomen dubium*. Their arguments are not convincing and therefore the name *Plantagini coronopodo-Camphorosmion monspeliacae* Golub et Karpov in Golub et al. 2005 remains a *nomen superfluum* (ICPN art. 29). (LM)
- *Plantagini coronopodo-Camphorosmion monspeliacae* Golub et Karpov in Golub et al. 2005 (29)

FEP-01E *Puccinellion lagascanae* Rivas-Mart. in Rivas-Mart. et M. Costa 1976 *corr*. Alonso et De la Torre 2004
Iberian relict saline grasslands on the edges of continental inland salt marshes
fep03 The placement of this alliance within the *Puccinellietalia* is unprecedented and motivated by the shared relict character of the inland salt-pan saline vegetation linked in the pleniglacial to the maximum extent of the steppe vegetation in the Pannonian Basin and other continental regions of Europe, such as Iberian Meseta Central and the Central Balkans. Rivas-Martínez et al. (2001: 201) classified this alliance within the *Juncetalia maritimi*. (LM)
- *Puccinellion fasciculatae* Rivas-Mart. 1976 (phantom)
- *Puccinellion fasciculatae* Rivas-Mart. in Rivas-Mart. et M. Costa 1976 (43)
- *Puccinellion tenuifoliae* Rivas-Mart. in Rivas-Mart. et M. Costa 1976 *corr*. Rivas-Mart. 1984 (*corr.superfl.*)
- *Puccinellion caespitosae* Rivas-Mart. in Rivas-Mart. et M. Costa 1976 *corr*. Rivas-Mart. et al. 2001 (*corr.superfl.*)
- *Puccinellion caespitosae* Rivas-Mart. in Rivas-Mart. et M. Costa 1976 *corr*. Rivas-Mart. et al. 2002 (*corr.superfl.*)

fep04 For the formal correction see Rivas-Martínez et al. (2002a: 241). (LM)

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FEP-02 *Halo-Agropyretalia* Ferrari et Speranza 1975

Saline vegetation on heavy clayey soils of badlands of the Apennines, the Balkans and Crimea

fep05 This rare and enigmatic vegetation type is associated with exposed and fast-eroding Miocene clayey deposits forming badland landscapes, known in Italy as 'calanchi'. Usually they occur in a complex with remnants of the Mediterranean relict tardiglacial steppes of the *Lygeo-Stipetea*. This vegetation occurs also in Hellas (for instance in Cephalonia; L. Mucina unpubl. data). We suggest that a new alliance could be coined to accommodate this vegetation in the Eastern Mediterranean. (LM)

- *Podospermo laciniati-Elytrigetalia athericae* Biondi, Allegrezza et Pesaresi in Biondi et al. 2014 (syntax.syn.)

FEP-02A *Halo-Artemision* Pignatti 1953

Apennine saline steppic vegetation on heavy clayey badland soils

- *Halo-Agropyrion* (Pignatti 1953) Ferrari et Speranza 1975 (29)
- *Parapholido-Podospermion cani* Ferrari et Gerdol 1987 (syntax.syn.)
- *Podospermo laciniati-Elytrigion athericae* Pirone 1995 (syntax.syn.)

FEP-02B *Artemision maritimae* Micevski 1970

Macedonian saline steppic vegetation on heavy clayey badland soils

- *Artemision santonici* Micevski 1970 *nom. mut. propos.* (45)

FEP-02C *Atraphaxo-Capparion* Korzhenevskii 1992

Crimean seaside vegetation on heavy clayey badland soils

fep06 Golub et al. (2005) have classified this alliance within the *Puccinellio festuciformis-Camphorosmetalia monspeliacae*. (LM)

- *Atraphaxo-Capparidion* Korzhenevskii 1988 (orig.form) (2b)

FEP-03 *Artemisio santonicae-Limonietalia gmelinii* Golub et V. Solomakha 1988

Saline vegetation on clay-rich solonetz-like and solonetz soils in the steppe and forest-steppe zones of Southern Ukraine and Russia

- *Festuco-Limonietalia* Mirkin in Golub et V. Solomakha 1988 (syntax.syn.)
- *Diantho guttati-Milietalia vernalis* Umanets et V. Solomakha 1998 (syntax.syn.)

FEP-03A *Plantagini salsae-Artemision santonici* Lysenko et Mucina in Lysenko et al. 2011

Saline vegetation in depressions and upper alluvial habitats on solonetz-like soils in the steppe and forest-steppe zones of Ukraine and Russia

- *Artemision santonici* Shelyag-Sosonko et V. Solomakha 1987 (31)

fep07 This name is a later homonym of the *Artemision maritimae* Mitsevski 1970. Necessity to replace this name with the *Plantagini salsae-Artemision santonici* was argued by Lysenko et al. (2011). (LM)

- *Puccinellion tenuissimae* Golub et al. 2001 (8)

FEP-03B *Limonion sareptani* Golub 1994

Saline vegetation around lakes in the semi-desert zone of the Lower Volga valley

FEP-03C *Limonion tomentelli* Agafonov et Golub in Golub 1994

Saline vegetation in shallow saline depressions in the forest-steppe and steppe zones of the Don River valley

- *Limonion tomentelli* Agafonov et Golub 1990 (1)
- *Limonio tomentelli-Artemision santonicae* Agafonov et Golub in Golub 1995 (syntax.syn.)

FEP-03D *Puccinellion giganteae* Dubyna et Neuhäuslová 2000

Saline vegetation on solonchak soils on coastal bars and islands along the Ukrainian Black Sea shores

fep08 Golub et al. (2003) classified this unit within the *Scorzonero-Juncetalia gerardi*. (LM)

- *Puccinellion giganteae* Golub et V. Solomakha 1988 (2b)
- *Salicornio-Puccinellion* Mirkin in Golub et V. Solomakha 1988 (3b)

FEP-03E *Festuco valesiacae-Limonion gmelinii* Mirkin in Golub et V. Solomakha 1988

Saline steppes on solonetz soils in the forest-steppe and steppe zones of the Volga and Ural River valleys

fep09 The syntaxonomic concept of this alliance is very heterogeneous and deserves revision. (TL, LM)

- *Limonion gmelinii* Golub 1994 (syntax.syn.)

FEP-03F *Diantho guttati-Milion vernalis* Umanets et V. Solomakha 1998

Subsaline dry steppes of the Lower Dnipr River valley

- *Halimiono-Aperion maritimae* Umanets et V. Solomakha 1998 (syntax.syn.)
- *Kochio-Artemision austriacae* Umanets et V. Solomakha 1998 (syntax.syn.)

FEP-04 *Artemisietalia pauciflorae* Golub et Karpov in Golub et al. 2005

Saline desertic steppe vegetation of the semi-desert zone of the northern Caspian seaboards and the Lower Volga valley

- *Artemisietalia pauciflorae* Golub, Karpov et Sorokin in Golub et al. 2006 (31)

FEP-04A *Artemisio pauciflorae-Camphorosmion monspeliacae* Karpov 2001

Saline desertic steppe vegetation of the Northern Caspian region

- *Artemision pauciflorae* Grebenyuk et al. 2000 (5)
- *Camphorosmo monspeliacae-Artemision pauciflorae* Karpov 2001 *nom. invers. propos.* (42)

fep10 A proposal to this effect was put forth by Lysenko et al. (2011). (LM)

- *Poo bulbosae-Artemision pauciflorae* Karpov et al. 2003 (2b)

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- *Artemision pauciflorae* Grebenyuk, Golub et Yuritsyna in Golub et al. 2005 (syntax.syn.)
- *Artemision pauciflorae* Grebenyuk, Golub et Yuritsyna in Golub et al. 2006 (31)

FEP-04B *Alhagion pseudalhagi* Golub et Czorbadze in Golub 1994

Saline desertic steppe vegetation on slopes and terraces around the inland pans of the Lower Volga River valley

- *Alhagion pseudalhagi* Golub et Czorbadze 1988 (1)

GROUP OF ORDERS ON FLOODED SOLONCHAK SOILS

FEP-05 *Scorzonero-Juncetalia gerardi* Vicherek 1973

Wet subsaline meadows and pastures of the Pannonian and Sarmatian regions of Central and Eastern Europe

- *Cirsietalia esculenti* Mirkin et Golub in Golub 1994 (syntax.syn.)

GROUP OF PANNONIAN-CARPATHIAN ALLIANCES

FEP-05A *Juncion gerardi* Wendelberger 1943

Wet subsaline regularly inundated meadows and pastures of southeastern Central Europe

- *Juncion gerardi* Wenzl 1934 (*sensu* Sanda et al. 1977) (phantom)
- *Scorzonero-Juncion gerardi* (Wendelberger 1943) Vicherek 1973 (29)
- *Taraxaco bessarabici-Juncion gerardi* Julve 1993 (2b)

FEP-05B *Beckmannion eruciformis* Soó 1933

Wet subsaline regularly inundated meadows on heavy clayey soils of the Pannonian Basin

- *Halo-Agrostion albae pannonicum* Knežević 1990 (2b, 5)

GROUP OF PONTIC-SARMATIAN AND SIBERIAN ALLIANCES

FEP-05C *Carici dilutae-Juncion gerardi* Lysenko et Mucina 2015

Wet subsaline grasslands in the forest-steppe zone of Southern Ukraine and Russia

FEP-05D *Agrostio stoloniferae-Beckmannion eruciformis* Mirkin in Barabash et al. 1989

Wet subsaline regularly inundated meadows on heavy clayey soils in the steppe and forest-steppe zones of Ukraine and Russia

FEP-05E *Cirsion esculenti* Golub 1994

Wet subsaline pastures in the steppe and forest-steppe zones of Russia, Southern Siberia and Eastern Kazakhstan

- *Artemision santonici* V. Solomakha et Sipailova 1987 (1)
- *Cirsio-Hordeion brevisubulati* Mirkin in Karpov et al. 1987 (1)
- *Geranion collini* Golub et Saveleva 1987 (1)
- *Cirsio-Hordeion brevisubulati* Mirkin in Golub et V. Solomakha 1988 (2b)
- *Geranion collini* Golub et Saveleva in Golub et V. Solomakha 1988 (2b)
- *Cirsio-Hordeion brevisubulati* Mirkin in Karpov et al. ex Golub 1994 (syntax.syn.)
- *Cirsio-Hordeion brevisubulati* Mirkin in Karpov et al. ex Golub 1994 (3f)
- *Geranion collini* Golub et Saveleva in Golub 1994 (syntax.syn.)

FEP-06 *Glycyrrhizetalia glabrae* Golub et Mirkin in Golub 1995

Moist subsaline alluvial meadows and herbfields in the steppe and semi-desert zones of the Don, Ural and Volga River valleys

FEP-06A *Glycyrrhizion echinatae* Golub et Saveleva in Golub 1995

Moist subsaline alluvial meadows in the steppe zone of the Lower Don River valley

FEP-06B *Glycyrrhizion korshinskyi* Lysenko 2010

Moist subsaline alluvial meadows in the steppe zone of the Volga and Ural River valleys

FEP-06C *Glycyrrhizion glabrae* Golub et Mirkin in Golub 1995

Moist subsaline alluvial meadows in the semi-desert zone of the Lower Volga River valley

- *Limonio gmelinii-Artemision lerchianae* Ageleulov et Golub in Golub 1995 (2b)

CRY *Crypsietea aculeatae* Vicherek 1973

Pioneer ephemeral dwarf-grass vegetation in periodically flooded saline habitats of submediterranean and (sub)continental Eurasia

cry01 Ecological and partly also floristic similarities of these communities to the *Thero-Salicornietea* have lead Rodwell et al. (2002) to include this syntaxon into that class. (LM) EB prefers to handle this syntaxon as part of the *Isoëto-Nanojuncetea* and Jarolímek & Šibík (2008) suggested considering this concept as part of the *Festuco-Puccinellietea*. (LM)

CRY-01 *Crypsietalia aculeatae* Vicherek 1973

Pioneer ephemeral dwarf-grass vegetation in periodically flooded saline habitats of submediterranean and (sub)continental Eurasia

- *Lepidietalia latifolii* Golub et V. Solomakha 1988 (2b, 3a)
- *Lepidietalia latifolii* Golub et V. Solomakha in Golub 1995 (syntax.syn.)

CRY-01A *Cypero-Spergularion salinae* Slavnić 1948

Pioneer ephemeral dwarf-grass vegetation in periodically flooded saline habitats of subcontinental Central and Eastern Europe

- *Crypsion aculeatae* Pignatti 1953 (3b)

CRY-01B *Heleochloion schoenoidis* Br.-Bl. ex Rivas Goday 1956

Pioneer ephemeral dwarf-grass vegetation in periodically flooded saline habitats in the (sub)mediterranean regions of Southern Europe and North Africa

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cry02 Rivas-Martínez et al. (1999: 368) considered this concept as an alliance in its own right. (LM)
- *Heleochloion schoenoidis* Br.-Bl. in Br.-Bl. et al. 1952 (3b)
- *Polygono salsuginei-Crypsion aculeatae* Korzhenevskii et Kliukin 1990 (1)
- *Polygono salsuginei-Crypsion aculeatae* Korzhenevskii et Kliukin 1991 (phantom)
- *Polygono salsuginei-Crypsion aculeatae* Korzhenevskii et Kliukin in Golub 1995 (2b)
- *Polygono salsuginei-Crypsion aculeatae* Korzhenevskii et Kliukin in Korzhenevskii et al. 1997 (syntax.syn.)

CRY-01C *Lepidion latifolii* Golub et Mirkin in Golub 1995

Pioneer ephemeral dwarf-grass vegetation in periodically flooded saline habitats of continental Eastern Europe
- *Lepidion latifolii* Golub et Mirkin 1986 (5)

VEGETATION OF THE CONTINENTAL DESERT ZONE

ZONAL VEGETATION OF CONTINENTAL SEMIDESERTS

LER *Artemisietea lerchianae* Golub 1994

Aralo-Caspian semi-desert vegetation
- *Artemisietea lerchianae* Golub in Golub et Savchenko 1986 (2b, 5)
- *Artemisietea lerchianae* Golub 1987 (1)
- *Artemisietea tschernievianae* Golub 1994 (syntax.syn.)

LER-01 *Artemisietalia lerchianae* Golub 1994

Caspian semi-desert vegetation on subsaline loamy and saline soils
- *Artemisietalia lerchianae* Golub et Savchenko 1986 (2b, 5)
- *Artemisietalia lerchianae* Golub 1987 (1)

LER-01A *Artemision lerchianae* Golub 1994

Caspian subsaline semi-desert vegetation on loamy soils
- *Artemision lerchianae* Golub et Savchenko 1986 (2b, 5)
- *Artemision lerchianae* Golub 1987 (1)

LER-01B *Anabasio aphyllae-Artemisio pauciflorae* Lysenko in Lysenko et Mucina 2015

Caspian saline semi-deserts on solonetz soils
- *Anabasion aphyllae* Golub et Savchenko 1986 (2b, 5)
- *Anabasion aphyllae* Golub 1987 (1)

LER-02 *Artemisietalia tschernievianae* Golub 1994

Caspian desert vegetation on stabilized sandy dunes
- *Artemisietalia tschernievianae* Golub et Savchenko 1986 (2b, 5)
- *Artemisietalia tschernievianae* Golub 1987 (1)

LER-02A *Euphorbion seguieranae* Golub 1994

Caspian desert vegetation on stabilized sandy dunes
- *Artemision tschernievianae* Golub et Savchenko 1986 (2b, 5)
- *Artemision tschernievianae* Golub 1987 (1)
- *Euphorbion seguieranae* Golub 1987 (1)

INTRAZONAL VEGETATION OF CONTINENTAL SEMIDESERTS

TAM *Tamaricetea arceuthoidis* Akhani et Mucina 2015

Tamarisk scrub of the semi-desert and desert zones of Central Asia, the Eastern Chinese and Mongolian deserts, Middle East and the Lower Volga River valley

tam01 The *Tamaricetea arceuthoidis* described only lately (Akhani & Mucina 2015) comprises riparian scrub communities of saline and subsaline alluvial habitats along mainly intermittent rivers. The core region of distribution of this syntaxon is the Irano-Turanian Floristic Region (unlike the Mediterranean for the *Nerio-Tamaricetea*) of continental Central Asia and the Middle East. Represented by the order *Elaeagno turcomanicae-Tamaricetalia ramosissimae* Akhani et Mucina 2015, it reaches the territory of Europe in the region of the Lower Volga River valley. (LM)
- *Retamo-Tamaricetea fluviatila* Zohary 1973 (2b)
- *Tamaricetea salina* Zohary 1973 (2b)
- *Tamaricetea ramosissimae* Akhani 2004 (2b, 5)

TAM-01 *Elaeagno turcomanicae-Tamaricetalia ramosissimae* Akhani et Mucina 2015

Tamarisk scrub of the semi-desert and desert zones of Central Asia and the Lower Volga River valley
- *Tamaricetalia ramosissimae* Golub et Kuzmina in Kuzmina 1996 (1)
- *Tamaricetalia ramosissimae* Golub in Barmin 2001 (2b, 5)

tam02 Because the designated nomenclatural type of the *Tamaricetalia ramosissimae* Golub in Barmin 2011 is invalidly published, the typification of the order is invalid as well. (LM)

TAM-01A *Agropyro fragilis-Tamaricion ramosissimae* Golub in Barmin 2001

Tamarisk riparian xero-mesophytic subsaline scrub of the semi-desert Lower Volga River valley
- *Tamaricion ramosssimae* Golub et Kuzmina in Bakhiev et al. 1994 (1)
- *Agropyro fragilis-Tamaricion ramosissimae* Golub et Kuzmina in Kuzmina 1996 (1)
- *Agropyro fragilis-Tamaricion ramosissimae* Golub et al. 1998 (phantom)

KAL *Kalidietea foliati* Mirkin et al. ex Rukhlenko 2012

Continental hypersaline scrub on edges of inland saline lakes and the seaboards of Eastern Europe and Central Asia
- *Halocnemetea irano-anatolicae* Zohary 1973 (2b)

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- *Halostachyetea* Chapman 1974 (2b)
- *Kalidietea* Mirkin in Kashapov et al. 1988 (1)
- *Kalidietea* Mirkin et al. 1988 (2b)
- *Halocnemetea strobilacei* Asri et Ghorbanli 1997 (2b)
- *Climacopteretea crassae* Akhani 2004 (3f, 5)
- *Petrosimonio-Kalidietea caspici* Mucina in Lysenko 2011 (2b, 3b)

KAL-01 *Kalidietalia foliati* Golub et al. 2001
Irano-Turanian desertic perennial chenopod scrub on hypersaline soils
- *Kalidietalia* Mirkin in Kashapov et al. 1988 (1)
- *Halocnemetalia strobilacei* Asri et Ghorbanli 1997 (2b)

KAL-01A *Kalidion caspici* Golub et al. 2001
Caspian desertic perennial chenopod scrub on hypersaline dry soils
- *Kalidion* Mirkin in Kashapov et al. 1988 (1)

KAL-01B *Climacoptero crassae-Suaedion acuminatae* Golub et Čorbadze 1989 *corr*. Lysenko et Mucina 2015
Caspian desertic perennial chenopod scrub in wet saline depressions
- *Climacoptero crassae-Suaedion salsae* Golub et Czorbadze 1988 (phantom)
- *Climacoptero crassae-Suaedion salsae* Golub et Čorbadze 1989 (43)

KAL-02 *Halimionetalia verruciferae* Golub et al. 2001
Pontic-Sarmatian and Crimean saline grasslands rich in dwarf shrubs on clayey soils in the steppe zone of Romania, Moldova, Ukraine and Russia
- *Halostachyetalia* Ţopa 1938 (phantom)
- *Halostachyetalia* Ţopa 1939 (2b)
- *Artemisio santonicae-Puccinellietalia fominii* Golub et al. 2001 (phantom)
- *Puccinellio festuciformis-Camphorosmetalia monspeliacae* Golub et Karpov in Golub et al. 2005 (syntax.syn.)
- *Puccinellio festuciformis-Camphorosmetalia monspeliacae* Golub, Karpov et Sorokin in Golub et al. 2006 (31)

KAL-02A *Artemisio santonicae-Puccinellion fominii* Shelyag-Sosonko et al. 1989
Pontic-Sarmatian saline grassland vegetation on solonchak soils of dried saline lakes in the steppe zone of Romania, Moldova, Ukraine and Russia
- *Halostachyion* Ţopa in Chapman 1959 (2b)
- *Petrosimonion crassifoliae* Chapman 1959 (2b)
- *Puccinellion fominii* Shelyag-Sosonko et V. Solomakha 1987 (5)
- *Puccinellion fominii* V. Solomakha et Sipailova 1987 (1)
- *Puccinellion fominii* Shelyag-Sosonko et V. Solomakha ex Golub 1994 (syntax.syn.)
- *Halimionio-Petrosimonion triandrae* Coldea 2000
- *Artemisio santonici-Puccinellion festuciformis* Golub et Karpov in Golub et al. 2005 (syntax.syn.)
- *Artemisio santonici-Puccinellion festuciformis* Golub, Karpov et Sorokin in Golub et al. 2006 (31)
- *Puccinellio limosae-Halimionion verruciferae* Coldea et Sărbu in Coldea 2012 (5)

KAL-02B *Camphorosmo-Agropyrion desertorum* Korzhenevsky et Klyukin ex Golub et al. 2006
Saline grassland vegetation on clay substrates of the dysfunctional mud volcanos of Crimea
- *Camphorosmo-Agropyrion desertorum* Korzhenevsky et Klyukin 1991 (5)

AEL *Aeluropodetea littoralis* Golub et al. 2001
Hypersaline alluvial temporary flooded swards in the semi-desert and desert zones of Central Asia, Middle East and the Ural River valley
- *Aeluropedetea littoralis* Golub, Lysenko et Rukhlenko in Rukhlenko 1999 (1)
- *Aeluropedetea littoralis* Akhani 2004 (2b)

AEL-01 *Aeluropodetalia littoralis* Golub et al. 2001
Hypersaline alluvial temporary flooded swards in the semi-desert and desert zones of Central Asia, Middle East and the Ural River valley
ael01 This order was typified by the *Suaedo paradoxae-Aeluropion littoralis* (Golub et al. 2001: 73), described from Turkmenistan. (LM)
- *Aeluropodetalia littoralis* Rukhlenko 2001 (31)

ael02 The name *Aeluropodetalia littoralis* was published twice (by different authors) validly in the same year, 2001 (Golub et al. 2001; Rukhlenko 2001). It was not possible to determine which publication was effectively published first, however the manuscript by Golub et al. (2001) was registered in the journal Biul. Mosk. Obsch. Ispyt. Prir, Otd. Biol. on September 6, 1998, while the other manuscript (later published as Rukhlenko 2001) was registered as submitted to Feddes Repertorium on September 6, 2000. Therefore the name *Aeluropodetalia littoralis* Golub et al. 2001 should be followed. (LM)

AEL-01A *Elytrigio-Aeluropodion* Ageleulov et Golub in Golub 1995
Hypersaline alluvial temporary flooded swards in the semi-desert zone of the Lower Ural River valley

VEGETATION OF THE MEDITERRANEAN ZONE

ZONAL MEDITERRANEAN FORESTS AND SCRUB

QUI *Quercetea ilicis* Br.-Bl. ex A. Bolòs et O. de Bolòs in A. Bolòs y Vayreda 1950
Thermo-mesomediterranean pine and oak forests and associated macchia of the Mediterranean

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qui01 For the details on the nomenclature of this class name see Willner et al. (2015). (LM)
- *Quercetea ilicis* Br.-Bl. in Br.-Bl. et al. 1947 (2b)
- *Quercetea ilicis* Br.-Bl. ex Br.-Bl. et al. 1952 (31)
- *Xero-Quercetea* Rothmaler 1954 (2b)
- *Quercetea calliprini* Zohary 1955 (syntax.syn.)
- *Aceretea orientalis* Zohary et Orshan 1966 (2b)
- *Euphorbietea dendroidis* Zohary et Orshan 1966 (2b)
- *Pino halepensis-Quercetea ilicis* de Foucault et Julve 1991 (5, 8)
- *Pistacio lentisci-Rhamnetea alaterni* Julve 1993 (syntax. syn.)

QUI-01 *Quercetalia ilicis* Br.-Bl. ex Molinier 1934

Evergreen and semi-deciduous thermo- to supramediterranean oak and relict laurel forests of the Central and Western Mediterranean
- *Quercetalia ilicis* Br.-Bl. 1931 (2b)
- *Quercetalia ilicis* Horvatić 1934
- *Quercetalia ilicis* Br.-Bl. ex Br.-Bl. et al. 1952 (31)
- *Quercetalia rotundifolio-ilicis* de Foucault et Julve 1991 (5)
- *Quercetalia rotundifolio-ilicis* de Foucault et Julve in de Foucault et al. 2013 (5)

GROUP OF WESTERN MEDITERRANEAN ALLIANCES

QUI-01A *Quercion ilicis* Br.-Bl. ex Molinier 1934

Thermo-supramediterranean mesic evergreen holm oak forests on calcareous substrates of the Western Mediterranean
- *Quercion ilicis* Br.-Bl. 1931 (2b)
- *Quercion ilicis* Br.-Bl. ex Br.-Bl. et al. 1952 (31)
- *Quercion ilicis valentinae* Rivas Goday et al. 1956 (34b)
- *Aceri monspessulani-Quercion ilicis* de Foucault et Julve 1991 (5)

QUI-01B *Oleo sylvestris-Quercion rotundifoliae* Barbero, Quézel et Rivas-Mart. in Rivas-Mart. et al. 1986 *nom. invers. propos.* (42)

Thermo-mesomediterranean evergreen oak forests on deep soils of the Iberian Peninsula and North Africa

qui02 In North Africa, the meso-supramediterranean belts are characterized by an altitudinal analogon, the *Balanseo glaberrimae-Quercion rotundifoliae* Barbero, Quézel et Rivas-Mart. ex Rivas-Mart. et al. 2011 (syn: *Balanseo glaberrimae-Quercion rotundifoliae* Barbero, Quézel et Rivas-Mart. 1981; ICPN art. 5). (LM)
- *Oleo sylvestris-Quercion rotundifolio-suberis* Barbero, Quézel et Rivas-Mart. 1981 (34c)
- *Querco rotundifoliae-Oleion sylvestris* Barbero, Quézel et Rivas-Mart. in Rivas-Mart. et al. 1986 (orig.form)

QUI-01C *Quercion broteroi* Br.-Bl. et al. 1956 *corr.* Rivas-Mart. 1972

Ibero-Atlantic meso-supramediterranean evergreen and semi-deciduous oak forests
- *Quercion fagineae* Br.-Bl. et al. 1956 (43)
- *Quercion fagineo-suberis* (Br.-Bl. et al. 1956) Rivas-Mart. 1975 (29)

GROUP OF CENTRAL AND EASTERN MEDITERRANEAN ALLIANCES

QUI-01D *Fraxino orni-Quercion ilicis* Biondi, Casavecchia et Gigante in Biondi et al. 2013

Evergreen and semideciduous calciphilous holm oak forests of the Central Mediterranean
- *Quercion ilicis* Br.-Bl. ex Horvatić 1934 (31)
- *Fraxino orni-Quercion ilicis* Biondi et al. 2003 (5)

QUI-01E *Erico-Quercion ilicis* S. Brullo et al. 1977

Evergreen and semideciduous acidophilous holm oak forests of the Central Mediterranean

QUI-01F *Genisto pilosae-Pinion pinastri* Biondi et Vagge 2015

Acidophilous Pinus pinaster forests of the Ligurian and Provencal seaboards

QUI-01G *Cyclamini cretici-Quercion ilicis* Barbero et Quézel in Quézel et al. 1993

Evergreen calcicolous mesic holm oak forests of the Eastern Mediterranean
- *Cyclamini cretici-Quercion brachyphyllae-ilicis* Barbero et Quézel 1980 (3g, 5)
- *Cyclamini cretici-Quercion ilicis* Barbero et Quézel ex Quézel et al. 1992 (phantom)

QUI-01H *Arbuto andrachnes-Quercion cocciferae* Barbero et Quézel 1979

Evergreen calcicolous mesic kermes oak forests of the Eastern Mediterranean
- *Andrachno-Quercion cocciferae* Barbero et Quézel 1979 (orig.form)

RELICT MEDITERRANEAN LAURISILVA

QUI-01I *Arbuto unedonis-Laurion nobilis* Rivas-Mart. et al. 1999

Relict Mediterranean laurel forests

qui03 This unit has a marginal position in this order. It represents relicts of the ancient warm-temperate evergreen forests that dominated the Mediterranean in the Tertiary (see Rodriguez-Sánchez et al. 2009). (LM)
- *Laurion nobilis* Lakušić 1975 (2b)
- *Arbuto unedonis-Laurion nobilis* Rivas-Mart., Fernández-González et Loidi in Loidi et al. 1997 (5)

QUI-02 *Quercetalia calliprini* Zohary 1955

Sclerophyllous oak and conifer forests and associated macchia in the thermo- to supramediterranean belts of the Eastern Mediterranean
- *Quercetalia ilicis orientalia* Zohary et Orshan 1966 (34b)

QUI-02A *Quercion calliprini* Zohary 1955

Sclerophyllous evergreen Palestine oak forests of the Eastern Mediterranean

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• *Quercion ilicis creticum* Zohary et Orshan 1966 (34b)

QUI-02B *Aceri sempervirentis-Cupression sempervirentis* Barbero et Quézel ex Quézel et al. 1993

Supramediterranean cypress forests of Crete

• *Aceri sempervirentis-Cupression sempervirentis* Barbero et Quézel 1980 (2b)
• *Aceri sempervirentis-Cupression sempervirentis* Barbero et Quézel ex Quézel et al. 1992 (phantom)

QUI-02C *Quercion alnifoliae* Barbero et Quézel ex Bergmeier, Mucina et Theurillat in Willner et al. 2015

Mesomediterranean evergreen endemic golden oak forests of Cyprus

• *Quercion alnifoliae* Barbero et Quézel 1979 (3h, 5)
• *Quercion alnifoliae* Barbero et Quézel ex Quézel et al. 1992 (phantom)
• *Quercion alnifoliae* Barbero et Quézel ex Quézel et al. 1993 (2b)

QUI-03 *Pinetalia halepensis* Biondi, Blasi, Galdenzi, Pesaresi et Vagge in Biondi et al. 2014

Thermo-mesomediterranean pine forests of the Central and Eastern Mediterranean

QUI-03A *Pistacio lentisci-Pinion halepensis* Biondi, Blasi, Galdenzi, Pesaresi et Vagge in Biondi et al. 2014

Thermo-mesomediterranean Aleppo pine forests on calcareous substrates of the Central Mediterranean

QUI-03B *Alkanno baeoticae-Pinion halepensis* Mucina et Dimopoulos in Mucina et al. 2009

Thermomediterranean Aleppo pine forests on ultramafic substrates of Euboea and the Hellenic mainland

• *Alyssion euboei* S. Brullo et al. 1997 *nom. dubium* (38)

qui04 For nomenclatural details of the *nomen dubium* status of this name see Mucina et al. (2009). (LM)

QUI-03C *Salvio fruticosae-Pinion brutiae* Konstantinidis, Mucina et Bergmeier *ined.*

Thermo-mesomediterranean Aegean pine forests on calcareous substrates of the Eastern Mediterranean

qui05 This alliance was coined to accommodate the Aegean (especially Cretan) *Pinus brutia* forests as represented for instance by the association *Rhamno lycioidis-Pinetum brutiae* (Konstantinidis et al. 2012). A full and valid description, accompanied by a syntaxonomic revision of *Pinus brutia* forests is in preparation (Konstantinidis et al. unpubl.). (LM)

QUI-03D *Pinion pineae* Feinbrun 1959

Thermomediterranean stone pine forests on leached sandy soils of ancient coastal dunes and inland alluvia of the Central and Eastern Mediterranean

qui06 Feinbrun (1959) classified this alliance within the *Quercetalia calliprini*, while Brullo et al. (2002) classified these iconic Mediterranean forests within the *Lavanduletalia stoechadis (Cisto-Lavanduletea*). (LM)

QUI-04 *Pistacio lentisci-Rhamnetalia alaterni* Rivas-Mart. 1975

Thermo-mesomediterranean low-grown matorral, macchia and garrigue of the Mediterranean Basin

qui07 Julve's (1993) description of the *Pistacio lentisci-Rhamnetea alaterni* was motivated by separation of the tall-scrub communities accommodated within the *Pistacio lentisci-Rhamnetalia alaterni* Rivas-Mart. 1975 from the Mediterranean fire-prone forests of the *Quercetalia ilicis*. This proposal was followed by Theurillat et al. (1995), but neglected by most the authors dealing with syntaxonomy of Mediterranean vegetation. (LM)

• *Xero-Quercetalia* Rothmaler 1943 (2b)
• *Xero-Prunetalia* Rivas Goday 1961 (2b)
• *Rhamno-Prunetalia* Rivas Goday et Rivas-Mart. 1964 (2b)
• *Tetraclinido-Arganietalia* Rivas Goday ex Fernández Casas et M.E. Sánchez 1972 (2b, 3f)
• *Tetraclinido-Arganietalia* Rivas Goday ex Esteve 1973 (2b, 3f)
• *Lauro nobilis-Viburnetalia tini* Julve 1993 (3b)

WESTERN MEDITERRANEAN ALLIANCES

QUI-04A *Ericion arboreae* (Rivas-Mart. ex Rivas-Mart. et al. 1986) Rivas-Mart. 1987

Thermo-mesomediterranean neutrophilous to acidophilous mesic matorral of the Mediterranean Basin

QUI-04B *Juniperion turbinatae* Rivas-Mart. 1975 *corr.* 1987

Thermomediterranean tall juniper scrub on coastal dune systems of the Western Mediterranean seaboards

• *Juniperion lyciae* Rivas-Mart. 1975 (43)

QUI-04C *Asparago albi-Rhamnion oleoidis* Rivas Goday ex Rivas-Mart. 1975

Thermomediterranean semiarid sclerophyllous scrub of the southern regions of the Iberian Peninsula

• *Asparago-Rhamnion* Rivas Goday 1964 (3b)

QUI-04D *Rhamno lycioidis-Quercion cocciferae* Rivas Goday ex Rivas-Mart. 1975

Eastern Iberian meso-supramediterranean semiarid oak and low pine matorral

• *Rhamno-Cocciferion* Rivas Goday 1964 (orig.form) (3b)

QUI-04E *Periplocion angustifoliae* Rivas-Mart. 1975

Thermomediterranean semiarid deciduous relict low matorral of the coastal regions of southeastern Spain, Sicily and the eastern regions of North Africa

• *Coccifero-Tetraclinidion* Rivas Goday 1964 (orig.form)
• *Querco cocciferae-Tetraclinidion articulatae* Rivas Goday ex Fernández Casas et M.E. Sánchez 1972
• *Coccifero-Tetraclinidion* Rivas Goday ex Esteve 1973 (orig. form)
• *Periploco angustifoliae-Tetraclinidion articulatae* Rivas-Mart. In Rivas-Mart. et al. 2011 (syntax.syn.)

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QUI-04F *Pino pinastri-Juniperion phoeniceae* Pérez Latorre et Cabezudo in Pérez Latorre et al. 1998

Betic (Southern Iberian) thermo- to supramediterranean matorral on ultramafic and dolomitic substrates

qui08 The formal inversion of the name was suggested by Rivas-Martínez et al. (2011: 372, 480). (LM)

- *Junipero phoeniceae-Pinion acutisquamae* Pérez Latorre et Cabezudo in Pérez Latorre et al. 1998 *corr*. Rivas-Mart. et al. 2002 *nom. invers. propos.* (42)
- *Pino acutisquamae-Juniperion phoeniceae* Pérez Latorre et Cabezudo ex Rivas-Mart. et al. 2001 (5, 8)
- *Pino acutisquamae-Juniperion phoeniceae* Pérez Latorre et Cabezudo in Pérez Latorre et al. 1988 *corr*. Rivas-Mart. et al. 2002 (43)

qui09 The formal correction of the name was suggested by Rivas-Martínez et al. (2002a: 240). (LM)

QUI-04G *Juniperion lagunae* Cano et al. 2007

Thermo- to supramediterranean dry juniper scrub of the Luso-Extremadurean Province of the Central Iberian Peninsula

- *Juniperion oxycedro-lagunae* Cano et al. 2007 (orig.form)

CENTRAL AND EASTERN MEDITERRANEAN ALLIANCES

QUI-04H *Oleo-Ceratonion siliquae* Br.-Bl. ex Guinochet et Drouineau 1944

Thermomediterranean calcicolous macchia of the Liguro-Tyrrhenian seaboards

- *Oleo-Ceratonion* Br.-Bl. 1936 (2b)
- *Myrtion communis* Allier et Lacoste 1980 (syntax.syn.)

QUI-04I *Asparago orientalis-Juniperion macrocarpae* (Díez Garretas et Asensi 2014) Mucina *stat. nov. hoc loco*

Thermomediterranean juniper scrub of the coastal dune systems of the Central and Eastern Mediterranean seaboards

qui19 The syntaxonomic synthesis of the *Juniperus macrocarpa* dominated costal dune scrub (Díez Garretas and Asensi 2014) in the Mediterranean reveals two floristically and geographically characterized units, interpreted as the suballiances *Juniperenion turbinatae* and *Asparago orientalis-Juniperenion macrocarpae*. The synoptic table in Díez Garretas and Asensi (2014: Tab. 1, columns 38–44) supports the floristic identity of the *Asparago orientalis-Juniperenion macrocarpae,* which we up-rank here onto the level of a new alliance the *Asparago orientalis-Juniperion macrocarpae*, recognizing the *Rubio tenuifoliae-Juniperetum macrocarpae* Géhu et al. 1992 (Colloq. Phytosociol. 19: 554–555, Tab. 28, rel. 13) as the *holotypus (hoc loco)* of the alliance. The diagnostic taxa of the alliance are: *Anthyllis hermanniae, Asparagus aphyllus* subsp. *orientalis, Erica manipuliflora, Genista acanthoclada, Juniperus macrocarpa* and *Salvia fruticosa*. (LM)

QUI-04J *Rhamno graecae-Juniperion lyciae* M. Costa et al. 1984

Aegeo-Anatolian and Cypriotic low-grown coastal garrigue

QUI-04K *Phlomido fruticosae-Euphorbion dendroidis* Mucina et Dimopoulos *all. nov. hoc loco*

Thermomediterranean calcicolous garrigue on steep coastal slopes of the Eastern Mediterranean

qui11 The *Phlomido fruticosae-Euphorbion dendroidis* is herein formally described to accommodate thermo-mediterranean garrigue on highly inclined or steep coastal slopes of calcareous soils in the Eastern Mediterranean. The *Euphorbia dendroides* communities of Hellas (including the Aegean archipelago and Crete) and of the Eastern Mediterranean differ markedly from similar communities from Spain, France, Italy and Croatia (see Eichberger 2001, 2003 for the latest syntaxonomic synthesis); the latter vegetation (including *Euphorbia dendroides* dominated communities form the Western Mediterranean) has been classified in the *Oleo-Ceratonion siliquae*. We assign the *Phlomido fruticosae-Euphorbietum dendroidis* Eichberger 2001 (Eichberger 2001: 193, Tab. 2) as the *holotypus (hoc loco)* of the *Phlomido fruticosae-Euphorbion dendroidis* and list *Asparagus aphyllus, Ballota acetabulosa, Ephedra foeminea, Euphorbia dendroides, Phlomis fruticosa* and *Salvia fruticosa* as the diagnostic species of the new alliance. (LM, PD)

- *Euphorbion dendroidis* Papastergiadou et al. 1997 (2b, 5)

QUI-04L *Ceratonio-Pistacion lentisci* Zohary et Orshan 1959

Thermomediterranean sclerophyllous evergreen macchia of the Eastern Mediterranean

- *Ceratonio-Pistacion lentisci* Zohary 1955 (2b)
- *Ceratonio-Pistacion creticum* Zohary et Orshan 1966 (34b)
- *Ceratonio-Rhamnion oleoidis* Barbero et Quézel 1979 (2b)
- *Ceratonio siliquae-Rhamnion oleoidis* Barbero et Quézel ex Quézel et al. 1993 (syntax.syn.)
- *Ceratonio siliquae-Rhamnion oleoidis* Barbero et Quézel ex Asensi et al. 2007 (31)

qui12 According to Asensi et al. (2007), the name *Rhamno graecae-Ceratonion siliquae* Barbero et Quézel in Asensi, Díez Garretas et Quézel 2007 would be the correct name for the *Ceratonio-Pistacion creticum* Zohary et Orshan 1966 *nom. illeg.*, *Ceratonio-Rhamnion oleoidis* Barbero et Quézel 1983 *nom. inval.*, *Ceratonio-Rhamnion oleoidis* Barbero et Quézel 1983 *nom. inval.*, *Rhamno graeci-Juniperion lyciae* Costa, Géhu, Peris et Biondi 1984 *nom. inval.* (JPT)

QUI-04M *Pistacio terebinthi-Rhamnion alaterni* Barbero et Quézel 1975

Mesomediterranean sclerophyllous garrigue of the Eastern Mediterranean

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ROS *Ononido-Rosmarinetea* Br.-Bl. in A. Bolòs y Vayreda 1950

Mediterranean scrub (tomillar, espleguer, romeral, garrigue, phrygana, batha) on base-rich substrates

ros01 Here we return to the original concept of the *Ononido-Rosmarinetea* that would encompass mediterranean scrublands on calcareous substrates in both Western and Eastern Mediterranean regions. This proposal, which leads to the demise of the class *Cisto-Micromerietea* (Oberdorfer 1954), is meant to remove a geographic-ecological asymmetry (two classes in the Western Mediterranean: *Ononido-Rosmarinetea* and *Cisto-Lavanduletea* vs one class in the Eastern Mediterranean: *Cisto-Micromerietea*). The alliances formerly classified in *Cisto-Micromerietea* (see Brullo et al. 2004) on calcareous substrates are here re-classified in the *Ononido-Rosmarinetea*, while the alliances typical of siliceous substrates (and formerly in *Cisto-Micromerietea*) are assigned (as a new order – see Remark *lav07* below) to the *Cisto-Lavanduletea*. Barbero & Quézel's (1989) claim that it would not be possible to distinguish two different classes (based on geochemistry of soil controlling two different species pools) in the Eastern Mediterranean could be due to the poor data then (in 1989) at their disposal. (LM)

- *Ononido-Rosmarinetea* Br.-Bl. in Br.-Bl. et al. 1947 (2b)
- *Ononido-Rosmarinetea* Br.-Bl. in Br.-Bl. et al. 1952 (31)
- *Cisto-Micromerietea julianae* Oberd. 1954 (syntax.syn.)
- *Erico-Cistetea* Trinajstić 1978 (phantom)
- *Erico-Cistetea* Trinajstić 1985 (5)
- *Rosmarinetea officinalis* Rivas-Mart. et al. 1991 (2b)
- *Rosmarinetea officinalis* Rivas-Mart. et al. 2002 (29)

WESTERN MEDITERRANEAN GROUP OF ORDERS

ROS-01 *Rosmarinetalia officinalis* Br.-Bl. ex Molinier 1934

Western Mediterranean thermo-supramediterranean dry-subhumid calcicolous scrub (tomillar, garrigue and matorral)

- *Rosmarinetalia* Br.-Bl. 1931 (2b)
- *Rosmarinetalia* Br.-Bl. in Br.-Bl. et Pawłowski 1931 (3f)
- *Rosmarinetalia* Br.-Bl. ex A. Bolòs et O. de Bolòs in A. Bolòs y Vayreda 1950 (31)
- *Rosmarinetalia* Br.-Bl. ex Br.-Bl. et al. 1952 (31)
- *Phlomidetalia purpureae* Rivas Goday et Rivas-Mart. 1969 (syntax.syn.)

IBERIAN GROUP OF ALLIANCES

ROS-01A *Lavandulo latifoliae-Genistion boissieri* Rivas Goday et Rivas-Mart. 1969

Betic (Southern Iberian) meso-supramediterranean calcicolous tomillar and matorral

- *Lavandulo latifoliae-Echinospartion boissieri* Rivas Goday et Rivas-Mart. 1969 *nom. mut. propos.* (45)

ros02 The formal proposal serving this name change was published by Rivas-Martínez et al. (2002a: 266–267) and Rivas-Martínez et al. (2011: 318). (LM)

ROS-01B *Eryngio trifidi-Ulicion erinacei* Rothmaler 1943

Thermo-mesomediterranean calcicolous scrub of the humid-per-humid regions of Southern Portugal and southwestern Spain

- *Coridothymo-Genistion umbellatae* Rivas Goday in Rivas Goday et Borja 1961 (2b)
- *Micromerio micranthae-Coridothymion capitati* Rivas Goday et Rivas-Mart. in Rivas Goday 1964 (3f)
- *Saturejo micranthae-Coridothymion capitati* Rivas Goday et Rivas-Mart. 1969 (29)
- *Saturejo micranthae-Thymbrion capitatae* Rivas Goday et Rivas-Mart. 1969 *nom. mut. propos.* (45)

ros03 The formal proposal serving this name change was published by Rivas-Martínez et al. (2002a: 278) and Rivas-Martínez et al. (2011: 316). (LM)

ROS-01C *Ulici densi-Thymion sylvestris* (Capelo et al. 1993) J.C. Costa et al. 2009

Thermo-mesomediterranean tomillar on eroded calcareous soils of the subhumid to humid Sadensean-Divinding regions of Portugal

- *Klaseo lusitanicae-Thymion sylvestris* (Capelo 1993) Rivas-Mart. et al. 2011 (29)

ROS-01D *Sideritido incanae-Salvion lavandulifoliae* (Rivas Goday et Rivas-Mart. 1969) Izco et Molina 1989

Central Iberian continental meso-supramediterranean calcicolous garrigue

ROS-01E *Helianthemo italici-Aphyllanthion monspelien-sis* Díez Garretas et al. 1998

Meso-supramediterranean dry-subhumid calciphilous scrub (espleguer and salviar) of the northeastern Iberian Peninsula

CATALONIAN-PROVENCAL AND TYRRHENIAN GROUP OF ALLIANCES

ROS-01F *Rosmarinion officinalis* Molinier 1934

Catalonian, Balearic and Provencal thermo- to supramediterranean semiarid to subhumid coastal calciphilous tomillar

- *Rosmarino-Ericion* Br.-Bl. 1931 (2b)
- *Rosmarino-Ericion* Br.-Bl. in Br.-Bl. et al. 1935 (syntax.syn.)

ros04 Rivas-Martínez et al. (2011: 315), without discussing the grounds or being supported by a decision of the Nomenclatural Commission, consider this syntaxon name as a *nomen conservandum* while rejecting the name *Rosmarinion officinalis* Br.-Bl. ex Molinier (34) on the same ground (ICPN art. 52), steps not warranted and undesirable. (LM)

- *Rosmarinion* Br.-Bl. et al. 1936 (syntax.syn.)
- *Rosmarino-Ericion* Br.-Bl. ex Br.-Bl. et al. 1952 (syntax.syn.)
- *Rosmarino-Ericion* O. de Bolòs 1957 (31)

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ROS-01G *Hypericion ericoidis* Esteve ex M. Costa et Peris 1985

Manchego-Murcian (Iberian Peninsula) thermomediterranean tomillar on calcareous and dolomitic lithosols

- *Hypericion ericoidis* Esteve 1968 (3b)

ROS-01H *Hypericion balearici* O. de Bolòs et Molinier 1958

Balearic thermo-mesomediterranean garrigue on calcareous and dolomitic lithosol

ROS-01I *Cisto cretici-Genistion corsicae* Arrigoni et Di Tommaso 1991

Cyrno-Sardean thermomediterranean garrigue on deep brown soils and terra rossa

ROS-01J *Polygalo-Seslerion insularis* Arrigoni ex Arrigoni et Di Tommaso 1986

Sardinian mesomediterranean calcicolous garrigue

- *Polygalo-Seslerion insularis* Arrigoni 1986 (2b)

ROS-02 *Erinacetalia anthyllidis* Quézel 1953

Oromediterranean and upper supramediterranean hedgehog scrub of the Sierra Nevada (Southern Iberian Peninsula) and the North African Atlas

ROS-02A *Xeroacantho-Erinaceion* (Quézel 1953) O. de Bolòs 1967

Oromediterranean and upper supramediterranean hedgehog scrub of the Sierra Nevada (Southern Iberian Peninsula) and the North African Atlas

- *Xero-Acanthion* Quézel 1953 (12)

ROS-03 *Gypsophiletalia* Bellot et Rivas Goday in Rivas Goday et al. 1957

Central and Southern Iberian thermo-to supramediterranean gypsicolous tomillar

- *Gypsophiletalia* Bellot 1952 (2b)

ROS-03A *Lepidion subulati* Bellot et Rivas Goday in Rivas Goday et al. 1957

Central Iberian and Almerian thermo-to supramediterranean gypsicolous tomillar

- *Lepidion subulati* Bellot 1952 (2b)
- *Gypsophilion hispanicae* Rivas Goday et al. 1957 (3b)
- *Gypsophilion* Br.-Bl. et O. de Bolòs 1958 (syntax.syn.)
- *Gypsophilo-Santolinion viscosae* Rivas Goday et Esteve 1968 (syntax.syn.)

ROS-03B *Thymo-Teucrion verticillati* Rivas Goday in Rivas Goday et al. 1957

Alicanto-Murcian (Iberian) thermo-mesomediterranean semiarid gypsicolous tomillar

- *Thymo modoreri-Teucrion libanotidis* Rivas Goday in Rivas Goday et al. 1957 *nom. mut. propos.* (45)

ROS-04 *Anthyllidetalia terniflorae* Rivas Goday et al. in Rivas Goday et Borja 1961

Infra-mesomediterranean tomillar on heavy clayey-loamy soils of the arid and semiarid regions of the Southern Iberian Peninsula

ROS-04A *Thymo-Sideritidion leucanthae* O. de Bolòs 1957

Murciano-Almerian (Southern Iberian) infra-thermomediterranean tomillar on calcareous marl substrates

- *Helianthemo almeriensis-Sideritidion pusillae* Alcaraz et al. 1989 (syntax.syn.)
- *Thymo moroderi-Sideritidion leucanthae* O. de Bolòs 1957 *corr*. Alcaraz et al. 1989 (43, *corr.illeg*.)
- *Thymo-Siderition leucanthae* O. de Bolòs 1957 (orig.form)

ROS-04B *Anthyllido terniflorae-Salsolion papillosae* Rivas Goday et Esteve 1968

Almerian (Southern Iberian) infra-thermomediterranean tomillar on ultramafic substrates

- *Frankenio-Salsolion genistoidis* Rivas Goday et Borja 1961 (2b)

ROS-04C *Sideritidion bourgaeanae* Peinado et Martínez-Parras in Peinado et al. 1992

Manchego-Murcian (Iberian) thermo-mesomediterranean tomillar on calcareous and dolomitic substrates

- *Sideritido bourgaeanae-Thymion funkii* P. Sánchez et Alcaraz 1993 (2b)

ROS-05 *Convolvuletalia boissieri* Rivas-Mart. et al. ex Díez et Asensi 1994

Betic (Southern Iberian) endemic thermo- to oromediterranean tomillar on dolomitic substrates

- *Convolvuletalia boissieri* Rivas-Mart. et al. in Pérez Raya 1987 (1)
- *Pterocephaletalia spathulati* Rivas-Mart., Pérez-Raya et Molero in Rivas-Mart. et al. 1988 (2b)
- *Convolvulo-Pterocephaletalia spathulati* Rivas-Mart. et al. in Peinado et al. 1992 (2b)

ROS-05A *Andryalion agardhii* Rivas-Mart. ex Rivas Goday et Mayor 1966

Betic (Southern Iberian) supra-oromediterranean pulvinate tomillar on dolomitic lithosols

- *Andryalion agardhii* Rivas-Mart. 1961 (2b)

ROS-05B *Lavandulion lanatae* (Martínez-Parras et al. 1984) Rivas-Mart. et al. 2002

Betic (Southern Iberian) thermo- to supramediterranean tomillar on dolomitic lithosols

- *Lavandulion lanatae* (Martínez-Parras et al. 1984) Rivas-Mart. et al. 2001 (2b)

EASTERN MEDITERRANEAN GROUPS OF ORDERS

ROS-06 *Cisto-Micromerietalia julianae* Oberd. 1954

Thermo-mesomediterranean phrygana of the continental Hellas and the Adriatic and Ionian seaboards

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ros06 Brullo et al. (1997) published the most comprehensive syntaxonomic synthesis of the Eastern Mediterranean phrygana to date. A preliminary numerical-syntaxonomic analysis (L. Mucina, unpubl.) of the material presented in the latter paper suggests, however, a different syntaxonomic scheme: (1) the floristic differentiation between the *Cisto-Ericetalia* Horvatić 1958 and the *Cisto-Micromerietalia julianae* Oberd. 1954 was not supported by the data; (2) given similarity shown between the Southern Aegean, Southern Anatolian, Cypriotic and North African phrygana, consideration of combining them into a single order in their own right is warranted, and (3) the latter order was shown as floristically very different from the syntaxonomic concept of the *Poterietalia spinosi* Eig 1939 (*Sarcopoterietalia spinosi* Eig 1939 *nom. mut. propos.*: the proposal of the name change was published by Brullo et al. 1997: 32), and it was obviously premature to use it for the Aegean-Anatolian (as well Cyrenaican) distribution areas of the former *Cisto-Micromerietea*. As Zohary & Orshan (1966: 28) pointed out, the *Poterietalia spinosi* Eig 1939 is a different unit from that which they described from Crete under the name '*Poterietalia spinosi intermedia*'. (LM)

- *Cisto-Ericetalia* Horvatić 1957 (2b)
- *Cisto-Ericetalia* Horvatić 1958 (syntax.syn.)

ROS-06A *Cisto cretici-Ericion manipuliflorae* Horvatić 1958

Thermomediterranean calcicolous garrigue of the Dalmatian and Istrian Adriatic seaboards

ros07 Biondi's (2000) paper, where this alliance was classified within the *Cisto-Micromerietea* while the other alliance (the *Cisto eriocephali-Ericion multiflorae* Biondi 2000) was classified within the *Rosmarinetea*, is not conclusive. (LM)

- *Cisto-Ericion* Horvatić 1957 (2b)

ROS-06B *Cisto eriocephali-Ericion multiflorae* Biondi 2000

Thermo-mesomediterranean calcicolous garrigue of the central and southern regions of the Adriatic and Ionian seaboards of the Apennine Peninsula

ROS-06C *Micromerion* Oberd. 1954

Meso-supramediterranean calcicolous phrygana of Northern Hellas

ROS-06D *Dorycnio-Coridothymion capitati* (Oberd. 1954) S. Brullo et al. 1997

Thermomediterranean calcicolous phrygana of Northern Hellas

- *Coridothymion* Oberd. 1954 (31)

ROS-07 *Hyperico empetrifolii-Genistetalia acanthocladae* Mucina *ordo nov. hoc loco*

Thermo-mesomediterranean phrygana of the southern regions of the Aegean, Crete, Cyprus, the Southern Anatolian seaboards and Cyrenaica

ros08 This vegetation has been previously classified in the *Poterietalia spinosi* Eig 1939 (see Remark *ros06*), but it deserves a status of order in its own right. Here we formally describe this order and designate the name *Hyperico empetrifolii-Micromerion graecae* Barbero et Quézel 1989 as the *holotypus (hoc loco;* Barbero & Quézel 1989: 44, 58) of the new order. The diagnostic taxa of the *Hyperico empetrifolii-Genistetalia acanthocladae* are: *Anthyllis hermanniae, Asperula pubescens, Carlina tragacanthifolia, Cynara cyrenaica, Euphorbia acanthothamnos, Genista acanthoclada, Helichrysum stoechas* subsp. *barrelieri, H. sanguineum, Hypericum empetrifolium, Hypericum thymifolium, Lithodora hispidula, Micromeria myrtifolia, Nepeta vivianii, Ononis spinosa* subsp. *antiquorum, Origanum syriacum, Phlomis floccosa, P. lanata, P. viscosa, Salvia fruticosa, Sarcopoterium spinosum, Scorzonera cretica, Stachys distans, S. tournefortii, Teucrium barbeyanum, T. divaricatum, T. microphyllum* and *T. micropodioides*. (LM)

- *Poterietalia spinosi-intermediae* Zohary et Orshan 1966 (2b)

ros09 This name is not only illegitimate because of the use of the epithet '*intermediae*', an epithet not based on a species name (ICPN 34), but it is also invalid because the protologue of the order '*Poterietalia spinosi intermedia*' does not contain any alliance which would accommodate two validly described associations for the order (ICPN art. 8). (LM)

- *Sarcopoterietalia spinoso-intermediae* Zohary et Orshan 1966 *nom. mut. propos.* (2b, *mut.superfl.*)

ROS-07A *Hyperico empetrifolii-Micromerion graecae* Barbero et Quézel 1989

Thermo- to supramediterranean calcicolous phrygana of the central and southern regions of Hellas, the Aegean region and Crete

ROS-07B *Origano syriaci-Hypericion thymifolii* Mucina et Theurillat *all. nov. hoc loco*

Thermomediterranean calcicolous phrygana of Southern Anatolia and the Levante

ros10 This new name replaces the unfortunate *Helichryso sanguinei-Origanion syriaci* Barbero et Quézel 1989 which, because of the erroneous choice of the type, should be deemed a *nomen dubium*. The *holotypus* (*hoc loco*) of this alliance is the *Hyparrhenio-Thymbretum spicatae* (Barbero & Quézel 1989: 47, 58) and the diagnostic species of the alliance are *Globularia trichosantha, Helichrysum sanguineum, Hypericum thymifolium, H. triquetrifolium, Micromeria myrtifolia, Nepeta curviflora, Onosma bornmuelleri, O. gigantea, Origanum laevigatum, O. syriacum, Phlomis viscosa, Polygala supina, Salvia aramiensis, Stachys distans* and *Teucrium kotschyanum*. (LM, JPT)

- *Helichryso sanguinei-Origanion syriaci* Barbero et Quézel 1989 *nom. dubium* (38)

ros11 Formally, the name *Helichryso sanguinei-Origanion syriaci* Barbero et Quézel 1989 was validly published, contrary to what Brullo et al. (1997) claim. However, the name

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Pterocephalo palaestini-Daphnetum sericei Barbero et Quézel 1989 (the type of the alliance) could be interpreted as a *nomen dubium*. Indeed, the type indicated by Barbero & Quézel (1989) for the association on p. 58 (relevé 11, Table 4) corresponds to another association, the *Galio fruticosi-Convolvuletum lineati*, as noted by Brullo et al. (1997: 39) who validated the latter name (Brullo et al. 1997: 40) because Barbero & Quézel failed to indicate a type. Therefore, the name *Helichryso sanguinei-Origanion syriaci* Barbero et Quézel 1989 may be considered a *nomen dubium* if its type, the name *Pterocephalo palaestini-Daphnetum sericei* Barbero and Quézel 1989 is considered a *nomen dubium* (ICPN art. 38) too. The fact that Brullo et al. (1997: 39) published again the name *Helichryso sanguinei-Origanion syriaci* Barbero et Quézel ex S. Brullo et al. 1997 is not helpful since this new name is only a later homonym of Barbero et Quézel's name. (JPT)

ROS-07C *Sarcopoterio spinosi-Genistion fasselatae* M. Costa et al. 1984

Thermo-mesomediterranean phrygana on sandy and loamy soils of Cyprus

- *Sarcopoterio spinosi-Genistion sphacelatae* M. Costa et al. 1984 *nom. mut. propos.* (45)

LAV *Cisto-Lavanduletea stoechadis* Br.-Bl. in Br.-Bl. et al. 1940

Mediterranean scrub (jaral, matorral, garrigue, phrygana) on acidic siliceous and ultramafic substrates

lav01 In Europe, this class encompasses three orders, the *Lavanduletalia stoechadis* Br.-Bl. in Br.-Bl. et al. 1940, the *Stauracantho genistoidis-Halimietalia commutati* Rivas-Mart. et al. 199 and a new order – the *Lavandulo stoechadis-Hypericetalia olympici* (see below). A fourth order (*Halimietalia riphaeo-atlantici* Quézel et al. 1988) is known from Morocco. (LM)

- *Cisto salviifolii-Lavanduletea stoechadis* Br.-Bl. in Br.-Bl. et al. 1940 (*sensu* Julve 1993) (Rec. 10C, 40)

LAV-01 *Lavanduletalia stoechadis* Br.-Bl. in Br.-Bl. et al. 1940

Western Mediterranean garrigue and other scrub on hard acidic siliceous and ultramafic bedrocks

- *Lavanduletalia stoechadis* Br.-Bl. 1931 (2b)
- *Stoechado-Lavanduletalia* Rothmaler 1943 (orig.form) (10)

lav02 Rothmaler (1943: 60) published the name '*Stoechado-Lavanduletalia*' (*recte*: *Stoechadi-Lavanduletalia*). The order's name is validly published with the presence of the validly (although illegitimate) alliance name *Coremation*, published at the same time. However, there is only one taxon of the genus *Lavandula* in the diagnosis of the *Coremation*, namely *L. stoechas* Tourn. Therefore, although the specific name '*stoechas*' is a validly published generic name *(Stoechas* Miller 1754) that would allow IPCN art. 14 to apply, there are no two different taxa of the genus *Lavandula* to allow a double name for the syntaxon according to IPCN art. 10. Therefore, the name '*Stoechado-Lavanduletalia* Rothmaler 1943' is a tautonym and, according to IPCN art. 10, the order's name being formed with only one plant species, it should be either '*Stoechadetalia*' or '*Lavanduletalia*', both being later syntaxonomic synonyms of the name *'Lavanduletalia* Braun-Blanquet in Braun-Blanquet, Molinier et Wagner 1940'. (JPT)

- *Ulici-Cistetalia* Br.-Bl. et al. 1964 (syntax.syn.)
- *Teucrio-Santolinetalia* Arrigoni 1986 (syntax.syn.)
- *Myrto communis-Ericetalia scopariae* Paradis et Pozzo di Borgo 2005 (syntax.syn.)

IBERIAN GROUP OF ALLIANCES

LAV-01A *Cistion laurifolii* Rivas Goday in Rivas Goday et al. 1956

Meso-supramediterranean acidophilous jarales and cantuesales of the north-central regions of the Iberian Peninsula

- *Cistion laurifolii* Rivas Goday 1949 (2b, 3b)
- *Cisto laurifolii-Lavandulion pedunculatae* Rivas-Mart. 1968 (syntax.syn.)

LAV-01B *Staehelino-Ulicion baetici* Rivas Goday et Rivas-Mart. 1969

Betic (Southern Iberian) thermo- to supramediterranean ultramafic garrigue

LAV-01C *Ulici argentei-Cistion ladaniferi* Br.-Bl. et al. 1964

Southern Iberian and Moroccan thermo-mesomediterranean xeric silicicolous garrigue

LAV-01D *Quercion fruticosae* Rothmaler 1954

Southwestern Iberian and North African coastal matorral on oligotrophic palaeo-podzolic soils

lav03 The name '*Frutici-Quercion*' was published on p. 597 in Rothmaler (1954) where he classified two associations: the '*Frutici-Quercetum taganum*' and the '*Frutici-Quercetum boivinii*'; both were validly published (see the synoptic Table 1 in Rothmaler l.c.). However, the names of the associations and of the alliance have to be corrected as per ICPN art. 14 because there is no genus named *'Frutex'*. Therefore, the validly published, corrected name for the alliance should read: *Quercion fruticosae* Rothmaler 1954. (JPT)

- *Frutici-Quercion* Rothmaler 1954 (14)
- *Quercion lusitanicae* Rothmaler 1954 *nom. mut. propos.* (45)

lav04 Rivas-Martínez et al. (2011: 370) published a proposal to this effect. (LM)

- *Pinion laricionis* Rivas Goday et al. 1954 (2b, 3a)

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TYRRHENIAN-LIGURIAN GROUP OF ALLIANCES

LAV-01E *Cistion ladaniferi* Br.-Bl. ex A. Bolòs et O. Bolòs in A. Bolòs 1950

Thermomediterranean acidophilous coastal garrigue of the northwestern Tyrrhenian and Ligurian seaboards

- *Cistion ladanifer* Br.-Bl. 1931 (orig.form) (2b)
- *Cistion ladaniferi* Br.-Bl. in Br.-Bl. et al. 1940 (2b)
- *Cistion mediomediterraneum* O. de Bolòs 1957 (34a)
- *Calicotomo spinosae-Cistion ladaniferi* (Br.-Bl. in Br.-Bl. et al. 1940) Rivas-Mart. 1979 (2b)
- *Lavandulion stoechadis* Julve 1993 (3b)

LAV-01F *Calicotomo villosae-Genistion tyrrhenae* Biondi 2000

Thermomediterranean acidophilous coastal garrigue of the southwestern Tyrrhenian seaboards

CYRNO-SARDEAN GROUP OF ALLIANCES

LAV-01G *Teucrion mari* (Gamisans et Muracciole 1984) Biondi et Mossa 1992

Cyrno-Sardean thermo-mesomediterranean acidophilous garrigue

- *Calicotomo villosae-Genistion tyrrhenae* Biondi 2000 (syntax.syn.)
- *Genistion corsicae* Paradis et Pozzo di Borgo 2005 (syntax.syn.)
- *Myrto communis-Ericion scopariae* Paradis et Pozzo di Borgo 2005 (syntax.syn.)

LAV-01H *Armerio sardoae-Genistion salzmannii* Arrigoni 1986

Sardinian supramediterranean silicicolous garrigue

lav05 Biondi (2000) suggested including this syntaxon within the *Teucrion mari*. (LM)

LAV-02 *Stauracantho genistoidis-Halimietalia commutati* Rivas-Mart. et al. 1990

Lusitano-Andalusian and Northern Moroccan thermo-mesomediterranean sandy scrub on acidic palaeodunes

- *Stauracantho genistoidis-Halimietalia calycini* Rivas-Mart. et al. 1990 *nom. mut. propos.* (45)

lav06 The proposal to mutate the name was published by Rivas-Martínez et al. (2011: 313). (LM)

LAV-02A *Coremation albi* Rothmaler 1943

Lusitano-Andalusian and Northern Moroccan thermo-mesomediterranean sandy scrub on acidic palaeodunes

- *Stauracantho genistoidis-Halimion halimifolii* Rivas-Mart. 1979 (syntax.syn.)
- *Stauracantho genistoidis-Coremation albi* Br.-Bl. et al. 1964 (29a)
- *Rubio longifoliae-Coremation albi* Rivas-Mart. in Rivas-Mart. et al. 1980 (syntax.syn.)

LAV-03 *Lavandulo stoechadis-Hypericetalia olympici* Mucina *ordo nov. hoc loco*

Eastern Mediterranean garrigue and phrygana on acidic siliceous and ultramafic substrates

lav07 This order accommodates the Eastern Mediterranean shrublands over siliceous and ultramafic substrates. The diagnostic taxa of the order are *Alkanna stribrnyi, Cistus albidus, C. creticus* subsp. *creticus, Dianthus pinifolius, Genista carinalis, Hypericum olympicum, Iris suaveolens, Lavandula stoechas, Silene paradoxa* and *Stachys angustifolia* and those of the subordinate alliances. The *Hyperico olympici-Cistion cretici* (Oberd. 1954) R. Jahn et Bergmeier in Mucina et al. 2009 (Mucina et al. 2009, Lazaroa 30: 273–274) is the *holotypus (hoc loco)* of this new order. (LM)

LAV-03A *Hyperico olympici-Cistion cretici* (Oberd. 1954) R. Jahn et Bergmeier in Mucina et al. 2009

Thermo-mesomediterranean silicicolous phrygana of Northern Hellas

lav08 For details on the nomenclature see Mucina et al. (2009). (LM)

- *Cistion orientale* Oberd. 1954 (34a)
- *Cisto-Hypericion bithynici* (Oberd. 1954) S. Brullo et al. 1997 (29)

LAV-03B *Odontarrheno euboeae-Lavandulion stoechadis* Mucina *all. nov. hoc loco*

Thermo-mesomediterranean ultramafic phrygana of the Sterea Hellas

lav09 Brullo et al. (1997: 34-35) described the *Alyssion euboaei*, an alliance that was typified by a very dubious 'forest' association (see Mucina & Dimopoulos 2000 for details), rendering their alliance name (and concept) a *nomen dubium*. Here I suggest that the phrygana on ultramafic substrates studied for instance, by Krause et al. (1963) and L. Mucina (unpubl.), is floristically, ecologically and biogeographically different (high number of local ultramafic endemics) and deserves recognition as an alliance in its own right. Therefore, I introduce the name *Odontarrheno euboeae-Lavandulion stoechadis all. nov. hoc loco* and I typify this alliance by assigning the *Fumano pintazii-Lavanduletum stoechadis* Mucina et Dimopoulos *ass. nov. hoc loco* as the *holotypus hoc loco*. The *holotypus (hoc loco)* of the latter association is the following relevé extracted from my unpublished report: Hellas, Evvia (Euboea) Island, Limni, SE of town, 20 June 1999 (rel. made by L. Mucina; the sampling scale used: Barkman et al. 1964); alt. 535 m, aspect: 33°, slope: 30°, vegetation cover: 100%; cover litter: 95%; dense phrygana/garrigue on ultramafic peridotite. *Lavandula stoechas* 2b, *Sarcopoterium spinosum* 2b, *Fumana pinatzii* 2m, *Hypochaeris achyrophorus* 2m, *Linum strictum*

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2m, *Trachynia distachya* 2m, *Anthyllis hermanniae* 1, *Centaurea laureotica* 1, *Odontarrhena euboea* 1, *Filago gallica* 1, *Misopates orontium* 1, *Aira elegantissima* +, *Allium* sp. +, *Asterolinon linum-stellatum* +, *Carlina corymbosa* +, *Convolvulus elegantissimus* +, *Hypericum empetrifolium* +, *Jurinea consanguinea* +, *Phillyrea latifolia* +, *Helictochloa bromoides* +, *Sarcopoterium spinosum* +, *Teucrium capitatum* +, *Thesium bergeri* +, *Thymelaea tartonraira* +, *Alkanna graeca* subsp. *baeotica* r. This alliance encompasses the ultramafic phrygana of Evvia Island as well as the adjacent mainland of the Sterea Hellas region. The diagnostic taxa of the alliance are *Alkanna graeca* subsp. *baeotica, Alyssum densistellatum, Centaurea ebenoides, C. laureotica, Erica manipuliflora, Fumana pinatzii, Hypericum empetrifolium, Jurinea consanguinea, Lavandula stoechas, Odontarrhena euboea, Onosma graeca, Thymus atticus* and *T. teucrioides* subsp. *candilicus*. (LM)

- *Cistion orientale* Krause et al. 1963 (2b)

LAV-03C *Helichryso barrelieri-Phagnalion graeci* (Barbero et Quézel 1989) R. Jahn in Mucina et al. 2009

Thermo-mesomediterranean silicicolous phrygana of Southern Hellas, the central and southern Aegean archipelago and adjacent Anatolia

lav10 For details on the nomenclature see Mucina et al. (2009). (LM)

INTRAZONAL MEDITERRANEAN SCRUB

NER *Nerio-Tamaricetea* Br.-Bl. et O. de Bolòs 1958

Circummediterranean and Macaronesian riparian scrub

- *Nerio-Tamaricetea gallicae* (O. de Bolòs 1956) Br.-Bl. et O. de Bolòs 1957 (*sensu* Julve 1993) (phantom)
- *Tamaricetea* Drossos 1992 (2b, 5)

NER-01 *Tamaricetalia africanae* Br.-Bl. et O. de Bolòs 1958

Circummediterranean and Macaronesian riparian scrub

ner01 Besides the alliances listed in this survey, this order also contains the *Tamaricion nilotico-articulatae* of North Africa (see de Foucault et al. 2012). (LM)

- *Nerio-Tamaricetalia* Br.-Bl. et Bolòs (orig.form) (*sensu* Lovrić sine dato) (phantom)
- *Tamaricetalia africanae* Br.-Bl. et O. de Bolòs 1957 (*sensu* Julve 1993) (phantom)
- *Viticetalia agni-casti* Lakušić 1972 (phantom)
- *Viticetalia agni-casti* Lakušić 1973 (2b)
- *Nerio oleandri-Viticetalia agni-casti* de Foucault et al. 2012 (syntax.syn.)

WESTERN MEDITERRANEAN GROUP OF ALLIANCES

NER-01A *Tamaricion africanae* Br.-Bl. et O. de Bolòs 1958

Infra- to supramediterranean tamarisk riparian scrub in temporarily flooded freshwater habitats of the Western Mediterranean

- *Tamaricion africanae* Br.-Bl. et O. de Bolòs 1957 (phantom)

NER-01B *Tamaricion boveano-canariensis* Izco et al. 1984

Infra- to supramediterranean tamarisk riparian scrub in temporarily flooded brackish habitats of the Western Mediterranean and Macaronesia

NER-01C *Rubo ulmifolii-Nerion oleandri* O. de Bolòs 1958

Thermo- to supramediterranean oleander riparian scrub of the Western Mediterranean

NER-01D *Securinegion buxifoliae* Rivas Goday ex López Sáez et Velasco-Negueruela 1995

Luso-Estremadurean (Iberian Peninsula) thermo-mesomediterranean riparian thorny tamujal

- *Securinegion buxifoliae* Rivas Goday 1964 (2b, 3b)
- *Securinegion tinctoriae* Rivas Goday 1964 *nom. mut. propos.* (2b, 3b, *mut.illeg.*)
- *Flueggeion tinctoriae* Rivas Goday ex López Sáez et Velasco-Negueruela 1995 *nom. mut. propos.* (45)

ner02 Rivas-Martínez et al. (2002a: 260; see also Rivas-Martínez et al. 2011: 341) published the formal proposal serving this name change. (LM)

EASTERN MEDITERRANEAN GROUP OF ALLIANCES

NER-01E *Tamaricion dalmaticae* Jasprica in Jasprica et al. 2016

Thermo-mesomediterranean tamarisk scrub of the Balkan Adriatic seaboards

- *Viticion agni-casti* Lakušić 1972 (phantom)
- *Tamaricion dalmaticae* Jasprica et Kovačić 2008 (2b, 5)

NER-01F *Rubo sancti-Nerion oleandri* S. Brullo et al. 2004

Thermomediterranean oleander riparian scrub of the Eastern Mediterranean

- *Nerion oleandri* Eig 1946 (2b)

CYT *Cytisetea scopario-striati* Rivas-Mart. 1974

Mediterranean and (sub)atlantic temperate broomy scrub (retamal, piornal, escobonal) seral to forests on acidic substrates

CYT-01 *Cytisetalia scopario-striati* Rivas-Mart. 1974

Western and Central Mediterranean thermo- to supramediterranean and submediterranean broomy cytisoid scrub

- *Cytisetalia scopario-striati* Rivas-Mart. 1974 (3f)
- *Retametalia sphaerocarpae* Rivas Goday 1980 (syntax.syn.)

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- *Genistetalia haenselero-ramosissimae* Pérez Latorre et Cabezudo in Pérez Latorre et al. 2004 (syntax.syn.)

CYT-01A *Ulici europaei-Cytision striati* Rivas-Mart. et al. 1991

Cantabro-Atlantic and Lusitanian submediterranean and meso-supramediterranean subhumid to hyperhumid broomy heath

CYT-01B *Genistion floridae* Rivas-Mart. 1974

Western Iberian upper meso-supramediterranean and submediterranean subhumid-humid genistoid retamal

- *Adenocarpion argyrophylli* Vicente Orellana et Galán de Mera 2008 (2b)

cyt01 This alliance (not explicitly handled by Rivas-Martínez et al. 2011: 327–332) is invalidly described as the authors (Vicente Orellana & Galán de Mera 2008) failed to list explicitly the character/differential species in the protologue. Rivas-Martínez et al. (2011) classified the *Adenocarpetum argyrophylli* (the type of the *Genistion floridae*), and therefore we identify the concept of the *Adenocarpion argyrophylli* with the *Genistion floridae*. (LM)

CYT-01C *Cytision multiflori* Rivas-Mart. 1974

Eastern Iberian supramediterranean subhumid-hyperhumid silicicolous broomy genistoid retamal

- *Genistion polygaliphyllae* Rivas-Mart. et al. 1984 (syntax. syn.)

CYT-01D *Retamion monospermae* Rivas-Mart. et Cantó in Rivas-Mart et al. 2002

Lusitano-Andalusian and Ibero-Tingitanian seral broomy scrub on deep littoral soils and palaeodune regosols

CYT-01E *Retamion sphaerocarpae* Rivas-Mart. 1981

Ibero-Lusitanian thermo- to supramediterranean semiarid continental semiarid retamal

- *Cytiso-Retamion* Rivas Goday 1980 (5)
- *Genistion haenselero-polyanthi* Pérez Latorre et Cabezudo 2002 (syntax.syn.)

CYT-01F *Adenocarpion decorticantis* (Rivas-Mart. et F. Valle ex F. Valle 1985) Rivas-Mart. et al. 1999

Upper meso- to oromediterranean silicicolous retamoid scrub of the Sierra Nevada (Southern Iberian Peninsula)

CYT-01G *Violo messanensis-Adenocarpion complicati* Mucina *all. nov. hoc loco*

Siculo-Calabrian meso-supramediterranean broom heath

cyt02 The name *Violion messanensis* (see Barbagallo et al. 1982) should be considered illegitimate since the eponymous taxon (*Viola bertolonii* subsp. *messanensis)* is a herb while the plant community is dominated by shrubs and dwarf shrubs. Here we follow Brullo & Furnari's (in Barbagallo et al. 1982) choice of the type for the alliance and designate the *Centaureo-Adenocarpetum intermedii* S. Brullo et Furnari in Barbagallo et al. 1982 as the *holotypus (hoc loco)* of the *Violo messanensis-Adenocarpion intermedii*. The character taxa of this new alliance include*: Adenocarpus complicatus* subsp. *complicatus*, *Micromeria graeca* subsp. *tenuifolia*, *Polygala alpestris* subsp. *angelisii*, *Thymus longicaulis* and *Viola bertolonii* subsp. *messanensis*. (LM)

- *Violion messanensis* S. Brullo et Furnari in Barbagallo et al. 1982 (29b)

CYT-02 *Cytiso villosi-Telinetalia monspessulanae* Rivas-Mart. et al. 2002

Aljibic, Tyrrhenian and Catalonian thermo-mesomediterranean subhumid-humid silicicolous genistoid retamal

- *Cytiso villosi-Telinetalia monspessulanae* Rivas-Mart. et al. 2001 (2b)
- *Phlomido purpureae-Retametalia sphaerocarpae* Rivas-Mart., Díez-Garretas et Asensi in Rivas-Mart. et al. 2011 (syntax.syn.)

CYT-02A *Telinion monspessulano-linifoliae* Rivas-Mart. et al. 2002

Aljibic, Tyrrhenian and Catalonian thermo-mesomediterranean subhumid-humid silicicolous genistoid retamal

- *Telinion monspessulano-linifoliae* Rivas-Mart. et al. 2001 (2b)

CYT-02B *Genisto spartioidis-Phlomidion almeriensis* Rivas Goday et Rivas-Mart. 1969

Almerian (Southern Iberian) infra- to mesomediterranean semiarid-arid retamoid scrub on calcareous and ultramafic substrates

CYT-02C *Genisto scorpii-Retamion sphaerocarpae* Rivas-Mart. et M. Costa in Rivas-Mart. et al. 2011

Ibero-Levantine thermo-mesomediterranean (rarely also supramediterranean) semiarid-subhumid retamal on calcareous substrates

- *Chronantho-Retamion* Rivas Goday 1980 (2b, 5)

CYT-02D *Genistion specioso-equisetiformis* Rivas-Mart. et F. Valle in Rivas-Mart. et al. 2011

Betic (Southern Iberian) thermo-mesomediterranean arid-subhumid genistoid retamal on calcareous and ultramafic substrates

CYT-03 *Spartio juncei-Cytisetalia scoparii* Mucina *ordo nov. hoc loco*

Temperate (sub)atlantic broom heath of Western Europe and the Southern European peninsulas

cyt03 This unit, described here as a new order, the *Spartio juncei-Cytisetalia scoparii* (*holotypus hoc loco: Sarothamnion scoparii* Oberd. 1957) is a cool-temperate and submediterranean analogon of the *Cytisetalia scopario-striati*. It comprises species-poorer communities of three alliances (*Sarothamnion scoparii* Oberd. 1957, *Cytision oromediterraneo-scoparii* Rivas-Mart. et al. 2002 and *Erico scopariae-Cytision scoparii* Mucina in Mucina et al. 2015). These communities lack the core stock of the mediterranean retamoid and genistoid broom taxa. The character species of this order include: *Cytisus scoparius, Erica scoparia* and *Spartium junceum*. A detailed syntaxonomic delimitation of the temperate and mediterranean *Cytisetea scopario-strati* will be presented elsewhere. (LM)

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- *Genistetalia* Rübel 1933 (2b)
- *Cytisetalia scoparii* Rameau 1996 (1)

CYT-03A *Sarothamnion scoparii* Oberd. 1957

Acidophilous broom and gorse mantle on forest edges and in forest clearings of the (sub)atlantic regions of Western Europe

- *Sarothamnion* Rübel 1933 (2b)
- *Sarothamnion scoparii* Tx. 1945 (1)
- *Sarothamnion scoparii* Tx. in Preising 1949 (1)
- *Sarothamnion* Oberd. 1956 (2b)
- *Ulici-Sarothamnion* Doing 1962 (2b)
- *Ulici-Sarothamnion* Doing 1969 (2b)
- *Ulici-Sarothamnion* Doing ex Weber 1997 (syntax.syn.)

CYT-03B *Cytision oromediterraneo-scoparii* Rivas-Mart. et al. 2002

Auverno-Pyreneean suboceanic temperate humid-hyperhumid silicicolous broomy heath and forest mantle

- *Cytision oromediterraneo-scoparii* Rivas-Mart. et al. 2001 (2b)

CYT-03C *Erico scopariae-Cytision scoparii* Mucina *all. nov. hoc loco*

Apennine broomy heath vegetation

cyt04 Agnolioni et al. (2007) recognized that the Ligurian and Tuscan Italian broom scrub cannot be classified within the *Telinion monspessulano-linifoliae* (see Vagge et al. 2004) and decided to place them within the *Sarothamnion scoparii* and classify this alliance within the *Cytisetalia scopario-striati* (*Cytisetea scopario-striati*). This step was taken earlier also by Passarge (1978: 174). We share their opinion only to a certain extent and suggest that the *Erica-Cytisus* broom heath of submediterranean Italy should constitute an alliance in its own right, which we call here the *Erico scopariae-Cytision scoparii* (*holotypus hoc loco: Adenocarpo complicati-Cytisetum scoparii* Blasi, Cavaliere, Abbate et Scoppola 1990; Blasi et al. 1990: Tab. 2) and designate *Adenocarpos complicatus, Erica scoparia, Cytisus scoparius, C. villosus* and *Genista desoleana* as (regional) character species of this new alliance. The *Erico scopariae-Cytision scoparii* further differs from its cool temperate counterpart *Sarothamnion scoparii* Oberd. 1957 by the occurrence of a set of species considered differential (against the *Cytision scoparii*), originating from the neighbouring mediterranean shrublands and woodlands. These species include *Arbutus unedo, Asphodelus ramosus, Castanea sativa, Cistus incanus, C. salviifolius, Dioscorea vulgaris, Dorycnium hirsutum, Erica arborea, Helichrysum italicum, Pinus pinaster, Pulicaria odora, Quercus cerris, Q. ilex* and *Rubus ulmifolius*. (LM)

INTRAZONAL MEDITERRANEAN GRASSLANDS AND HERBLANDS

LYG *Lygeo sparti-Stipetea tenacissimae* Rivas-Mart. 1978 *nom. conserv. propos.*

Circum-mediterranean pseudosteppes on calcareous rocky substrates and relict edaphic steppes on deep clayey soils

lyg01 If we consider the name *Thero-Brachypodietea* as a *nomen ambiguum*, the name *'Lygeo sparti-Stipetea tenacissimae'* deserves to be conserved as the correct and current name of this class. (LM)

- *Thero-Brachypodietea* Br.-Bl. in Br.-Bl. et al. 1947 (2b, 36)
- *Thero-Brachypodietea ramosi* Br.-Bl. ex A. Bolòs y Vayreda et O. de Bolòs 1950 *nom. ambig. rejic. propos.* (10a, 36)

lyg02 The names *Thero-Brachypodietea*, *Thero-Brachypodietalia* and *Thero-Brachypodion* are to be considered *nomina ambigua* since they can no longer be used without ambiguity according to their nomenclature type, that is, only for perennial Mediterranean grasslands (pseudo-steppes) with therophytes, as they are often at variance with their nomenclature type for annual plant communities (e.g. Theurillat et al. 1995). Inasmuch, they have been considered repeatedly as *nomina ambigua*, for instance by Rivas-Martínez et al. (1999, 2001, 2002a, 2011; Bardat et al. 2004). (JPT, LM)

- *Thero-Brachypodietea* Br.-Bl. ex Br.-Bl. et al. 1952 *nom. ambig. rejic. propos.* (36)
- *Phlomidi lychnitidis-Brachypodietea retusi* Rossellò 1994 (2b)

LYG-01 *Cymbopogono-Brachypodietalia ramosi* Horvatić 1963

Circum-mediterranean thermo- to supramediterranean pseudosteppes on sandy-loamy soils over calcareous bedrocks

- *Thero-Brachypodietalia* Br.-Bl. 1931 (2b)
- *Thero-Brachypodietalia* Br.-Bl. ex Bharucha 1932 *nom. ambig. rejic. propos.* (36)

lyg03 Rivas-Martínez et al. (2011: 286) declared this name a *nomen dubium* (ICPN art. 38) without giving convincing grounds to underpin their claim. (LM)

- *Cymbopogono-Brachypodietalia* Horvatić 1957 (2b)
- *Cymbopogono-Brachypodietalia* Horvatić 1958 (2b)
- *Hyparrhenio hirtae-Brachypodietalia ramosi* Horvatić 1963 *nom. mut. propos.* (45)

lyg04 Because *Cymbopogon hirtus* is a synonym of *Hyparrhenia hirta* and this name has not been in use in modern Mediterranean and European floras for some time, following ICPN art. 45, Bergmeier et al. (2009: 434) proposed to substitute the names *Cymbopogono-Brachypodion ramosi* and *Cymbopogono-Brachypodietalia ramosi*, by the names *Hyparrhenio-Brachypodion ramosi* and *Hyparrhenio-Brachypodietalia ramosi*, respectively. (EB, LM)

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- *Dauco-Hyparrhenietalia* Izco 1978 (2b)
- *Hyparrhenietalia hirtae* Rivas-Mart. 1978 (5)
- *Hyparrhenietalia podotrichae* Rivas-Mart. 1978 *corr.* Rivas-Mart. et al. 1992 (*corr.superfl.*)
- *Brachypodietalia retusi* Julve 1993 (2b)
- *Convolvulo althaeoidis-Hyparrhenetalia villosae* (Rivas-Mart. 1978) Roselló 1994 (29)
- *Phlomido lychnitis-Brachypodietalia retusi* Rosselló 1994 (5)
- *Brachypodio ramosi-Dactylidetalia hispanicae* Biondi et al. 2001 (syntax.syn.)

WESTERN MEDITERRANEAN GROUP OF ALLIANCES

LYG-01A *Phlomido lychnitidis-Brachypodion retusi* Mateo ex Theurillat et Mucina *all. nov. hoc loco*

Western Mediterranean thermo- to supramediterranean semiarid pseudosteppes on calcareous substrates

lyg05 The *Teucrio pseudochamaepityos-Brachypodion retusi* Br.-Bl. ex Rivas-Mart. 2011 (see Rivas-Martínez et al. 2011: 286) is an invalid name because the type of the name was invalidly published. Indeed, the new name '*Irido chamaeirido-Brachypodietum retusi* (Br.-Bl. in Br.-Bl., Roussine & Nègre 1952) Rivas-Mart. 2011' (Rivas-Martínez et al. 2011: 287) should have been published simply as a change of rank. Rivas-Martínez et al. (l.c.) attempted description ('*ass. nov.*') of the latter unit, however, they assigned the synoptic relevé for the subassociation '*crucianelletosum*' as the 'type' of the association. Hence the typification was performed invalidly since only a relevé can serve a type in this context. Because there is apparently no validly published name for the '*Thero-Brachypodion* Br.-Bl. 1925', here we propose validation of the *Phlomidi lychnitis-Brachypodion retusi* Mateo 1983 *nom. inval.* (Mateo 1983) and select the *Phlomido lychnitidis-Brachypodietum retusi* Br.-Bl. 1925 (Braun-Blanquet 1925: 304–320) as the *holotypus (hoc loco)* of the alliance. The diagnostic taxa of this alliance are: *Acis valentina, Allium chamaemoly, A. moschatum, Arenaria valentina, Asphodelus ramosus, Astragalus verrucosus, Biarum dispar, Brachypodium retusum, Carlina corymbosa, Charybdis maritima, C. numidica, C. undulata, Dactylis hispanica, Dorycnium pentaphyllum, Eryngium dilatatum, Helictochloa bromoides, Iris lutescens, Ophrys bombyliflora, O. lutea* subsp. *galilaea, O. lutea* subsp. *lutea, O. tenthredinifera, Pancratium illyricum, Phlomis lychnitis, Reichardia picroides, Stipa offneri, S. pauneroana, Teucrium pseudochamaepitys* and *Trisetum flavescens* subsp. *splendens*. (JPT, LM)

- *Thero-Brachypodion* Br.-Bl. 1925 *nom. ambig. rejic. propos.* (36)

lyg06 The *Thero-Brachypodion* was described validly by Braun-Blanquet (1925) who assigned to this alliance the validly published 'association à *Brachypodium ramosum* et *Phlomis lychnitis* (= *Brachypodietum ramos*i)'. Mutation of the original form of the name ('*Thero-Brachypodion*' to '*Thero-Brachypodion ramosi*' or '*Thero-Brachypodion retusi*') is not acceptable (ICPN art. 40a) since there are two different species of *Brachypodium* in the protologue: *Brachypodium retusum* and *B. distachyon* (*recte*: *Trachynia distachya*). (LM)

- *Thero-Brachypodion ramosi* Br.-Bl. 1925 (40a, *mut. superfl.*)

lyg07 Rivas-Martínez et al. (2002a: 282) published the formal proposal serving this name change. (LM)

- *Thero-Brachypodion retusi* Br.-Bl. 1925 (40a, *mut. superfl.*)
- *Phlomidi lychnitis-Brachypodion retusi* Mateo 1983 (orig. form) (2b)

lyg08 Rivas-Martínez et al. (2011: 286) declared this name a *nomen dubium* (ICPN art. 38) without giving convincing grounds to underpin their claim. (LM)

- *Scabioso turolensis-Brachypodion retusi* Rosselló 1994 (2b)
- *Asphodelo aestivi-Brachypodion retusi* de Foucault 1999 (phantom)
- *Bupleuro baldensis-Brachypodion distachyi* (Br.-Bl. 1925) de Foucault 1999 (phantom)
- *Asphodelo aestivi-Brachypodion retusi* Foucault 2001 (2b)
- *Bupleuro baldensis-Brachypodion distachyi* de Foucault 2001 (8)
- *Teucrio pseudochamaepitys-Brachypodion retusi* Rivas-Mart. in Rivas-Mart. et al. 2011 (5)

LYG-01B *Triseto velutini-Brachypodion boissieri* Rivas-Mart. et al. 2002

Southern Iberian thermo- to supramediterranean perennial pseudosteppes on dolomitic and ultramafic soils

- *Triseto velutini-Brachypodion boissieri* Rivas-Mart. et al. 2001 (2b)

LYG-01C *Festucion scariosae* Martínez-Parras et al. 1984

Betic (Southern Iberian) upper meso-supramediterranean semiarid pseudosteppes on deep calcareous soils

LYG-01D *Stipion parviflorae* De la Torre et al. 1996

Ibero-Levantine thermo- to supramediterranean subnitrophilous pseudosteppes on shallow calcareous soils

CENTRAL AND EASTERN MEDITERRANEAN GROUP OF ALLIANCES

LYG-01E *Leontodonto tuberosi-Bellion sylvestris* Biondi et al. 2001

Thermo-mesomediterranean secondary pseudosteppes on deep calcareous soils of the Central and Eastern Mediterranean

LYG-01F *Reichardio maritimae-Dactylidion hispanicae* Biondi et al. 2001

Thermomediterranean subhalophilous perennial grasslands in wind-swept habitats on calcareous soils of the Tyrrhenian, Ionian and Aegean coasts

LYG-01G *Cymbopogono-Brachypodion ramosi* Horvatić 1963

Thermo-mesomediterranean pseudosteppes on calcareous sandy soils of the Eastern Mediterranean

- *Cymbopogono-Brachypodion ramosi* Horvatić 1957 (2b)
- *Cymbopogono-Brachypodion ramosi* Horvatić 1958 (2b)

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- *Hyparrhenio-Brachypodion ramosi* Horvatić 1963 *nom. mut. propos.* (45)
- *Alyssion muralis* Konstantinou 1992 (1)

Alyssion muralis Konstantinou et Babalonas 1996 (5)
Alyssion muralis Konstantinou in Čarni et al. 2000 (2b, 5)
lyg09 The classification of the conceptually heterogeneous *Alyssion muralis* (still invalidly described) within the *Cymbopogono hirti-Brachypodion ramosi* is a tentative solution pending further enquiry. (LM)

LYG-01H *Hyparrhenion hirtae* Br.-Bl. et al. 1956

Thermo-mesomediterranean pseudosteppes on calcareous sandy soils of the Western Mediterranean and southern regions of the Central Mediterranean

lyg10 Here we follow the classification schemes for the Mediterranean *Hyparrhenia*-dominated communities (Díez-Garretas & Asensi 1999; C. Brullo et al. 2010) suggesting fusion of the *Hyparrhenion hirtae, Saturejo-Hyparrhenion hirtae, Aristido-Hyparrhenion* and *Panico repentis-Hyparrhenion* into a single unit. (LM)

- *Dauco criniti-Hyparrhenion hirtae* (Br.-Bl. et al. 1956) O. de Bolòs 1962 (29a)
- *Ampelodesmion tenacis* Gentile 1960 (3b)
- *Micromerio graecae-Hyparrhenion hirtae* O. de Bolòs 1962 (30, *corr.illeg.*)
- *Saturejo-Hyparrhenion hirtae* O. de Bolòs 1962 (syntax. syn.)
- *Micromerio graecae-Hyparrhenion podotrichae* O. de Bolòs 1962 *corr.* Rivas-Mart. et al. 1992 (30, *corr.illeg.*)

lyg11 This name mutation (correction) is not warranted since *H. podotricha* (Steud.) Andersson is considered a later, heterotypic synonym of *Hyparrhenia hirta* (L.) Stapf. (LM)

- *Avenulo cincinnatae-Ampelodesmion mauritanici* Minissale 1995 (syntax.syn.)
- *Aristido coerulescentis-Hyparrhenion hirtae* S. Brullo et al. 1997 (syntax.syn.)
- *Hyparrhenion sinaicae* Br.-Bl., Pinto da Silva et Rozeira 1956 *corr.* J.C. Costa et al. 2001 (*corr.superfl.*)
- *Panico repentis-Hyparrhenion hirtae* S. Brullo et Siracusa 2000 (syntax.syn.)

LYG-02 *Lygeo-Stipetalia tenacissimae* Br.-Bl. et O. de Bolòs 1958

Relict Mediterranean edaphic steppes on deep clayey soils

lyg12 Unlike Rivas-Martínez et al. (2002b: 510; 2011: 286), who conceptually identified the *Lygeo-Stipetalia* with the *Thero-Brachypodietalia* (and suggested the latter name to be rejected as *nomen ambiguum*), we consider both orders as separate entities. We wish to underline here the ecological difference between these syntaxa and suggest that the *Lygeo-Stipetalia* is considered a unit of true (non-anthropogenic) relict (albeit edaphic) steppe communities, frequently found on specific, deep, clayey Miocene sediments forming 'Mediterranean badlands'. The remnants of such steppes remind us of the potentially larger distribution of such vegetation in the Mediterranean during the glacial maxima. (LM)

LYG-02A *Agropyro pectinati-Lygeion sparti* Br.-Bl. et O. de Bolòs 1958 *corr.* Rivas-Mart. et al. 1999

Relict Central Iberian edaphic steppes on deep clayey soils

- *Eremopyro cristati-Lygeion sparti* Br.-Bl. et O. de Bolòs 1958 (43)

LYG-02B *Stipion tenacissimae* Rivas-Mart. 1984

Relict Southern Iberian thermomediterranean edaphic steppes on deep loamy-clayey soils

- *Stipion tenacissimae* Rivas-Mart. 1978 (2b)

LYG-02C *Moricandio-Lygeion sparti* S. Brullo et al. 1990

Relict Southern Italian and Ionian thermo-mesomediterranean edaphic steppes on deep clayey soils

- *Polygonion tenoreani* S. Brullo et al. 1990 (syntax.syn.)

LYG-02D *Scorzonero creticae-Lygeion sparti* S. Brullo et al. 2002

Relict Cretan thermomediterranean edaphic steppes on deep clayey soils

SAC *Stipo giganteae-Agrostietea castellanae* Rivas-Mart. et al. 1999

Mediterranean thermo- to supramediterranean and humid submediterranean perennial acidophilous oligo-mesotrophic grasslands

- *Agrostietea castellanae* de Foucault 1994 (3b)
- *Celtico giganteae-Agrostietea castellanae* Rivas-Mart. et al. 1999 *nom. mut. propos.* (*mut.illeg.*)

sac01 This name mutation, published by Rivas-Martínez et al. (2011: 289), is obviously motivated by the results of latest taxonomic and nomenclatural changes in the Mediterranean Poaceae (Valdés & Scholz 2006), in part based on molecular-phylogenetic studies that resulted in re-classification of *Stipa gigantea* Link as *Celtica gigantea* (Link) F.M. Vázquez & Backworth. Although this taxonomic-nomenclatural deed is convincing, the name *Stipa gigantea* has been in use for the past 20 years, while the name *Celtica gigantea* is relatively new (introduced in 2006). This proposal is, therefore, premature. (LM)

SAC-01 *Agrostietalia castellanae* Rivas Goday ex Rivas-Mart. et al. 1980

Iberian thermo- to supramediterranean perennial acidophilous oligo-mesotrophic pastures

- *Agrostietalia castellanae* Rivas Goday 1957 (phantom)
- *Agrostietalia annua* Rivas Goday 1958 (34a)
- *Agrostietalia* Rivas Goday et Rivas-Mart. 1963 (2b)

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SAC-01A *Festuco amplae-Agrostion castellanae* Theurillat *ined.*

Ibero-Atlantic thermo- to supramediterranean acidophilous perennial grasslands on sandy-loamy soils

- *Agrostion castellanae-tenuis* Rivas Goday 1957 (phantom)
- *Agrostion castellanae-tenuis* Rivas Goday 1958 *nom. ambig. rejic. propos.* (36)
- *Agrostion castellanae* Rivas Goday 1958 *corr*. Rivas Goday et Rivas-Mart. 1963 *nom. ambig. rejic. propos.* (36)

SAC-01B *Festucion merinoi* Rivas-Mart. et Sánchez-Mata in Rivas-Mart. et al. 1986 *corr*. Rivas-Mart. et Sánchez-Mata in Rivas-Mart. et al. 2002

Western Ibero-Cantabrian supramediterranean subhumid-humid acidophilous pastures on humic brown soils

- *Festucion elegantis* Rivas-Mart. et Sánchez-Mata in Rivas-Mart. et al. 1986 (43)

sac02 For the formal correction of this name see Rivas-Martínez et al. (2002a: 235). (LM)

SAC-01C *Agrostio castellanae-Stipion giganteae* Rivas Goday ex Rivas-Mart. et Fernández-González 1991

Lusitano-Carpetanian thermo- to supramediterranean xeric-subhumid acidophilous pastures on sandy-loamy soils

- *Agrostio castellanae-Stipion giganteae* Rivas Goday 1958 (3b)
- *Agrostio castellanae-Celticion giganteae* Rivas Goday ex Rivas-Mart. et Fernández-González 1991 *nom. mut. propos.* (*mut.illeg*.)

sac03 See Remark *sac02*.

SAC-02 *Parafestucetalia albidae* Rivas-Mart. et al. 2001

Silicicolous perennial grasslands on shallow andosols on rocky outcrops of the supratemperate hyperhumid regions of Madeira

- *Festucetalia jubatae* Capelo et al. 2000 (3b)
- *Parafestucetalia albidae* Rivas-Mart. et al. 2002 (31)

SAC-02A *Deschampsio maderensis-Parafestucion albidae* Capelo et al. 2000

Silicicolous perennial grasslands on shallow andosols on rocky outcrops of the supratemperate hyperhumid regions of Madeira

SAC-03 *Armerietalia rumelicae* V. Ranđelović et N. Ranđelović in V. Ranđelović et Zlatković ex Mucina et Čarni in Di Pietro et al. 2015

South-Central Balkan supratemperate submediterranean silicicolous perennial grasslands

- *Armerietalia rumelicae* V. Ranđelović et N. Ranđelović 2001 (phantom)
- *Armerietalia rumelicae* V. Ranđelović et al. 2008 (2b, 5)
- *Armerietalia rumelicae* V. Ranđelović et N. Ranđelović in V. Ranđelović et Zlatković 2010 (5)

SAC-03A *Armerio rumelicae-Potentillion* Mitsevski 1978

South-Central Balkan supratemperate submediterranean silicicolous perennial grasslands

BUL *Poetea bulbosae* Rivas Goday et Rivas-Mart. in Rivas-Mart. 1978

Mediterranean and Magrebinian seasonal perennial and ephemeroid pastures in the thermo- to oromediterranean belts

bul01 This vegetation type has been well studied only on the Iberian Peninsula and our current knowledge of its geographic variability and extent remains only anecdotal in other parts of the Mediterranean. Besides Provence (Aubert & Loisel 1972) and Southern Italy (Brullo & Grillo 1978), the communities of this class have also been studied in Hellas (Oberdorfer 1954; L. Mucina, unpubl. data). (LM)

BUL-01 *Poetalia bulbosae* Rivas Goday et Rivas-Mart. in Rivas Goday et Ladero 1970

Mediterranean and Maghrebinian seasonal perennial and ephemeroid pastures in the thermo- to oromediterranean belts

GROUP OF WESTERN MEDITERRANEAN ALLIANCES

BUL-01A *Trifolio subterranei-Periballion minutae* Rivas Goday 1964

Central and Western Iberian heavily grazed seasonal perennial pastures on acidic substrates in the thermo- to oromediterranean belts

- *Periballio minutae-Trifolion subterranei* Rivas Goday 1964 *nom. invers. propos.* (42)
- *Molineriello minutae-Trifolion subterranei* Rivas Goday 1964 *nom. invers. propos et nom. mut. propos.* (42, 45)

bul02 The proposal to invert and mutate the name was presented by Rivas-Martínez et al. (2011: 282). (LM)

- *Poo-Trifolion subterranei* Rivas Goday et Ladero 1970

BUL-01B *Plantaginion serrariae* Galán de Mera et al. 2000

Southern Iberian and Magrebinian seasonal perennial pastures on basic clayey soils in the thermo- and mesomediterranean belts

BUL-01C *Poo bulbosae-Astragalion sesamei* Rivas Goday et Ladero 1970

Central and Eastern Iberian heavily grazed seasonal perennial pastures on calcareous substrates

- *Astragalo sesamei-Poion bulbosae* Rivas Goday et Ladero 1970 *nom. invers. propos.* (42)

bul03 The proposal to invert the name was presented by Rivas-Martínez et al. (2011: 283). (LM)

GROUP OF CENTRAL AND EASTERN MEDITERRANEAN ALLIANCES

BUL-01D *Ornithogalo corsici-Trifolion subterranei* (Farris et al. 2013) Farris et Mucina *stat. nov. hoc loco*

Sardinian meso-supramediterranean heavily grazed perennial sheep pastures

bul04 This syntaxon was described in great detail by Farris et al. (2013) and ranked as a new suballiance within the *Periballio-Trifolion subterranei*. Here we recognize the large

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floristic differences between the *Periballio-Trifolion subterranei* and the *Ornithogalo corsici-Trifolenion subterranei* (as already alluded to in Farris et al. 2013: 942) and up-rank the latter to the rank of alliance. We list *Crocus minimus, Gagea bohemica, Morisia monanthos, Ornithogalum corsicum, Romulea requieni* and *Veronica verna* subsp. *brevistyla* as the character-taxa of the new alliance; we also recognize the *Ornithogalo corsici-Poetum bulbosae* Farris et al. 2013 as the *holotypus (hoc loco)* of the alliance. (E. Farris, LM)

BUL-01E *Plantaginion cupanii* S. Brullo et Grillo 1978

Siculo-Calabrian supramediterranean mesic seasonal perennial pastures on calcareous substrates

bul05 Inclusion of this alliance in the *Poetea bulbosae* is for the first time attempted in this paper. (LM)

BUL-01F *Romuleion* Oberd. 1954

Macedonian seasonal perennial pastures on acidic substrates

- *Romuleion graecae* Oberd. 1954 *corr.* O. de Bolòs et al. 1986 (orig.form) (Rec. 10C, 40)

TUB *Helianthemetea guttati* Rivas Goday et Rivas-Mart. 1963

Mediterranean and submediterranean-atlantic annual low-grown ephemeral herb- and grass-rich vegetation on acidic substrates

- *Tuberarietea guttatae* Rivas Goday et Rivas-Mart. 1963 *nom. mut. propos.* (45)

tub01 The formal proposal serving this name change has been published by Rivas-Martínez et al. (2002a: 283). (LM)

- *Helianthemetea annua* Br.-Bl. ex Rivas Goday 1958 (34a)
- *Xolanthetea guttati* Rivas Goday et Rivas-Mart. 1963 *nom. mut. propos.* (45)
- *Therocistetea guttatae* Pinto da Silva in Correia et Pinto da Silva 1993 (29, 34b)
- *Ononido variegatae-Cutandietea maritimae* de Foucault 1999 (5)

TUB-01 *Helianthemetalia guttati* Br.-Bl. in Br.-Bl. et al. 1940

Mediterranean and submediterranean-atlantic inland ephemeral vegetation on nutrient-poor shallow acidic soils

tub02 Delimitation of this order against the *Thero-Airetalia* (*Koelerio-Corynephoretea*) needs further study since alliances such as the *Molinerion laevis* Br.-Bl. et al. 1952 and the *Sedion pedicellato-andegavensis* Rivas-Mart. et al. 1986 show a high level of floristic similarity with the *Thero-Airetalia*. (JD)

- *Tuberarietalia guttatae* Br.-Bl. in Br.-Bl. et al. 1940 *nom. mut. propos.* (45)

tub03 Rivas-Martínez et al. (2002a: 283) published the formal proposal serving this name change. (LM)

WESTERN MEDITERRANEAN GROUP OF ALLIANCES

TUB-01A *Helianthemion guttati* Br.-Bl. in Br.-Bl. et al. 1940

Thermo- to supramediterranean therophytic pastures on nutrient-poor sandy soils of the Western Iberian Peninsula

- *Helianthemion guttati* Br.-Bl. 1931 (2b)
- *Tuberarion guttatae* Br.-Bl. in Br.-Bl. et al. 1940 *nom. mut. propos.* (45)

tub04 Rivas-Martínez et al. (2002a: 283) published the formal proposal serving this name change. (LM)

- *Moenchion erectae* Rivas Goday 1958
- *Brachypodio-Paronychion* Rivas Goday 1964 (syntax.syn.)
- *Thero-Brachypodion siliceum* Rivas Goday 1964 (orig.form) (corresp.; as suballiance) (34a)

TUB-01B *Crassulo tillaeae-Sedion caespitosi* de Foucault 1999

Thermo- to supramediterranean succulent herblands on nutrient-poor sandy soils of the Iberian Peninsula

- *Sedion caespitosi* (Rivas-Mart. 1978) P. Prieto et X. Font 2005 (syntax.syn.)

TUB-01C *Molinerion laevis* Br.-Bl. et al. 1952

Silicicolous meso- to oromediterranean therophytic late-flowering pastures of the Iberian Peninsula

- *Molineriellion laevis* Br.-Bl. et al. 1952 *nom. mut. propos.* (45)

tub05 Rivas-Martínez et al. (2002a: 269) published the formal proposal serving this name change. (LM)

- *Arenario-Cerastion ramosissimi* Rivas Goday et Rivas-Mart. 1963 (syntax.syn.)
- *Periballion* Rivas Goday et Rivas-Mart. 1963 (3a)
- *Airion caryophylleo-praecocis* Rivas-Mart. 1978 (3a)
- *Triseto ovati-Agrostion truncatulae* (Rivas-Mart. 1978) Rivas-Mart. et al. 1986 (3n)

tub06 Dengler (2003) suggested classifying this unit within the *Thero-Airetalia*. (LM)

- *Agrostion truncatulae* (Rivas-Mart. 1978) de Foucault 1999 (phantom)
- *Hispidello hispanicae-Ctenopsion delicatulae* de Foucault 1999 (syntax.syn.)
- *Agrostion truncatulae* (Rivas-Mart. 1978) de Foucault 2001

TUB-01D *Sedion pedicellato-andegavensis* Rivas-Mart. et al. 1986

Meso- to oromediterranean succulent annual vegetation on fine gravels and granitic outcrops of the Iberian Peninsula

EASTERN MEDITERRANEAN GROUP OF ALLIANCES

TUB-01E *Trifolion cherleri* Micevski 1972

Submediterranean silicicolous therophytic swards of Macedonia and Southern Bulgaria

- *Trifolion cherleri* Micevski 1970 (2b)

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TUB-01F *Scleranthо-Myositidion incrassatae* S. Brullo et al. 2001

Central and Eastern Mediterranean silicicolous supra-oromediterranean therophytic vegetation

MADEIRAN-AZOREAN GROUP OF ALLIANCES

TUB-01G *Thymion micantis* J.C. Costa et al. 2005

Pioneer spring and early summer ephemeral vegetation on acidic oligotrophic shallow soils of Madeira

TUB-01H *Ornithopodo pinnati-Gaudinion coarctatae* Fernández Prieto et Aguiar in Fernández Prieto et al. 2012

Pioneer spring and early summer ephemeral vegetation on acidic oligotrophic shallow soils of the Azores

- *Ornithopodo pinnati-Gaudinion coarctatae* Aguiar et al. 2006 (2b)

TUB-02 *Vulpietalia* Pignatti 1953

Mediterranean and Ibero-Atlantic ephemeral therophytic vegetation on coastal sand dunes under influence of salt spray

- *Ononido variegatae-Cutandietalia maritimae* de Foucault 1999 (5)
- *Cutandietalia maritimae* Rivas-Mart., Díez Garretas et Asensi in Rivas-Mart. et al. 2002 (syntax.syn.)

WESTERN MEDITERRANEAN GROUP OF ALLIANCES

TUB-02A *Linarion pedunculatae* Díez Garretas in Izco et al. 1988

Ephemeral therophytic vegetation on coastal dunes of the Atlantic seaboards of Portugal, the Southern Iberian Peninsula and Western Maghreb

- *Linarion pedunculatae* Díez Garretas et al. in Díez Garretas 1978 (2b)
- *Linarion pedunculatae* Díez Garretas et al. in Díez Garretas 1984 (3f)

TUB-02B *Alkanno-Maresion nanae* Rivas Goday in Rivas Goday et Rivas-Mart. 1963 *corr.* Díez Garretas et al. 2001

Ephemeral therophytic vegetation on coastal dunes of the Northern Iberian Peninsula and the Ligurian-Tyrrhenian seaboards

- *Alkanno-Malcolmion parviflorae* Rivas Goday 1958 (2b)
- *Alkanno-Malcolmion ramosissimae* Rivas Goday in Rivas Goday et Rivas-Mart. 1963 (43)
- *Alkanno-Malcolmion parviflorae* Rivas Goday ex S. Brullo et Marcenò 1974 (31)
- *Maresio-Malcolmion ramosissimae* (Rivas-Mart. 1978) Rivas-Mart. et al. 1992 (syntax.syn.)
- *Malcolmion ramosissimae* Géhu et Biondi in Géhu 1994 (2b, 5)
- *Cutandio maritimae-Vulpion membranaceae* de Foucault et Géhu in de Foucault 1999 (phantom)
- *Ornithopodo pinnati-Malcolmion ramosissimae* (Rivas Goday 1958) de Foucault 1999 (phantom)
- *Sileno conicae-Vulpion membranaceae* de Foucault 1999 (phantom)
- *Sileno sericeae-Malcolmion ramosissimae* de Foucault et Géhu in de Foucault 1999 (phantom)
- *Cutandio maritimae-Vulpion membranaceae* de Foucault et Géhu in de Foucault 2001 (syntax.syn.)
- *Ornithopodo pinnati-Malcolmion ramosissimae* (Rivas Goday 1958) de Foucault 2001 (29)
- *Sileno conicae-Vulpion membranaceae* de Foucault 2001 (syntax.syn.)
- *Sileno sericeae-Malcolmion ramosissimae* de Foucault et Géhu in de Foucault 2001 (syntax.syn.)

CENTRAL AND EASTERN MEDITERRANEAN GROUP OF ALLIANCES

TUB-02C *Psammo-Vulpion* Pignatti 1953

Ephemeral therophytic vegetation on coastal dunes along the northern seaboards of the Adriatic Sea

TUB-02D *Vulpio-Lotion* Horvatić 1963

Ephemeral therophytic vegetation on the terra rossa and decalcified soils of the Illyrian-Dinaric coastal regions

tub07 The syntaxonomic relationship between this unit and the *Psammo-Vulpion* should be subject to further scrutiny. (LM)

- *Vulpio-Lotion* Horvatić 1960 (2b)
- *Loto angustifoliae-Vulpion ciliatae* Horvatić 1960 *nom. invers. propos.* (2b, *invers.superfl.*)

tub08 The name inversion was proposed by Trinajstić (2008: 83), however this suggestion is superfluous since the name suggested for inversion was invalidly published. (LM)

TUB-02E *Maresion nanae* Géhu et al. 1987

Ephemeral therophytic vegetation on coastal dunes of the Northern Aegean region

- *Malcolmion nanae* Géhu et al. 1986 (phantom)

TUB-02F *Medicagini-Triplachnion nitentis* Mayer 1995

Ephemeral therophytic vegetation on sandy and gravelly beaches of the Southern Aegean region and Anatolia

- *Silenion kotschyi* Géhu et al. 1992 (5, 8)

CANARIAN-MAGHREBINIAN ALLIANCE

TUB-02G *Ononidion tournefortii* Géhu et al. 1996

Ephemeral therophytic vegetation on coastal sandy soils of the Canary Islands and southwestern Morocco

TUB-03 *Malcolmietalia* Rivas Goday 1958

Mediterranean ephemeral therophytic vegetation on near-coastal and inland deep sandy soils outside the salt-spray influence

- *Malcolmietalia lacerae* Rivas Goday 1958 *corr.* de Foucault 1999 (*corr.superfl.*)

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TUB-03A *Anthyllido hamosae-Malcolmion lacerae* Rivas Goday 1958

Thermomediterranean sandy ephemeral therophytic vegetation on sandy soils of the western and southwestern regions of the Iberian Peninsula

- *Hymenocarpo hamosi-Malcolmion trilobae* Rivas Goday 1958 *nom. mut. propos.* (45)

tub09 The formal proposal serving this name change was published by Rivas-Martínez et al. (2002a: 263). (LM)

TUB-03B *Corynephoro articulati-Malcolmion patulae* Rivas Goday 1958

Meso- to lower supramediterranean ephemeral therophytic vegetation on inland sand dunes of the Western Iberian Peninsula

TUB-03C *Corynephorion maritimi* Costa, Pinto-Gomes, Neto et Rivas-Mart. in J.C. Costa et al. 2012

Thermo- and lower mesomediterranean ephemeral therophytic vegetation on inland palaeodunes of the Lusitanian-Andalusian and Galician-Portuguese regions

TUB-03D *Ormenido multicaulis-Malcolmion broussonetii* Br.-Bl. in Br.-Bl. et al. 1940

Thermomediterranean ephemeral therophytic vegetation on decalcified littoral plains of Western Maghreb

TUB-03E *Filagini asterisciflorae-Linarion humilis* Minissale et Sciandrello 2015

Thermomediterranean ephemeral therophytic vegetation on fossil dunes of Southern Sicily

- *Evaco asterisciflorae-Linarion humilis* Minissale et Sciandrello 2013 (2b, 5)

TRA *Stipo-Trachynietea distachyae* S. Brullo in S. Brullo et al. 2001

Mediterranean calciphilous annual and ephemeroid swards and grasslands

tra01 The therophyte-rich dwarf-herb and low-grass communities on calcareous substrates have been relatively well studied in the Western Mediterranean (including the Tyrrhenian region), but they remain only poorly known in the Eastern Mediterranean. Only recently have some alliances have been described from Italy (*Vulpio ciliatae-Crepidion neglectae* Poldini 1989, *Hypochoeridion achyrophori* Biondi et Guerra 2008), but their syntaxonomic relationship to the Western Mediterranean units remains unclear. We may presume that phytogeographic criteria may play a major role in the syntaxonomic subdivision of this order, yet how these vegetation types are differentiated along major environmental gradients is not well understood. (LM)

- *Stipo-Brachypodietea distachyae* S. Brullo 1985 (2b)

TRA-01 *Brachypodietalia distachyi* Rivas-Mart. 1978

Western Mediterranean ephemeral winter pastures on shallow sandy and loamy soils over limestone, dolomite and gypsum

- *Trachynietalia distachyae* Rivas-Mart. 1978 *nom. mut. propos.* (45)
- *Linarietalia saturejoidis* Rivas Goday et G. López in G. López 1979

TRA-01A *Trachynion distachyae* Rivas-Mart. 1978

Western Mediterranean ephemeral winter pastures on shallow skeletal base-rich soils over calcareous substrates

tra02 Rivas-Martínez (1978b: 59, 64) explicitly cited '*Thero-Brachypodion (Trachynion)* Br.-Bl. 1925 em.', however he has not cited 'Braun-Blanquet (1925)' in the references of his paper. (LM)

- *Thero-Brachypodion calcicolum genuinum (calcicolo) calcareoum* Rivas Goday 1964 (orig.form) (corresp.; as suballiance) (34a)
- *Brachypodion distachyi* Rivas-Mart. 1978 *nom. mut. propos.* (*mut.superfl.*)
- *Sideritido romanae-Hypochaeridion achyrophori* de Foucault 1999 (phantom)
- *Sideritido romanae-Hypochaeridion achyrophori* de Foucault 2001 (5)
- *Sideritido romanae-Brachypodion distachyi* de Foucault 2001 (3f)
- *Asterisco-Velezion rigidae* Rivas Goday 1964 (29)

tra03 Rivas Goday (1964) named the '*Asterisco-Velezion rigidae nova*' first as suballiance (p. 369). However, in the same text it was also named explicitly as an alliance on p. 372; this creates a paradox situation as the *Asterisco-Velezion* becomes a *nomen superfluum* since Rivas Goday (l.c.) handled the description of this new alliance under the '*Thero-Brachypodion* Br. Bl. 1925'. (LM)

- *Asterisco-Velezion rigidae* (Rivas Goday 1964) S. Brullo 1985 (31)

TRA-01B *Stipion retortae* O. de Bolòs 1957

Western Mediterranean ephemeral winter pastures on loamy soils over calcareous substrates

- *Stipion capensis* O. de Bolòs 1957 *nom. mut. propos.* (45)

tra04 The formal proposal serving this name change was published by Rivas-Martínez et al. (2002a: 281). (LM)

- *Stipion retortae* Br.-Bl. et O. de Bolòs 1954 (2b)
- *Stipion retortae* Br.-Bl. et O. de Bolòs ex Izco 1974 (31)
- *Stipion capensis* Br.-Bl. et O. de Bolòs ex Izco 1974 *nom. mut. propos.* (*mut.superfl.*)

TRA-01C *Sedo-Ctenopsion gypsophilae* Rivas Goday et Rivas-Mart. ex Izco 1974

Iberian ephemeral winter pastures on gypsum substrates

- *Crucianellion patulae* Rivas Goday et Borja 1959 (2b)
- *Vulpion gypsophilae* Rivas Goday et Borja 1959 (2b)
- *Sedo-Vulpion gypsophilae* Rivas Goday et Rivas-Mart. 1963 (2b)
- *Sedo-Ctenopsion (Vulpion) gypsophilae* Rivas Goday et Rivas-Mart. ex Izco 1974 (orig.form)

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TRA-01D *Omphalodion commutatae* Rivas-Mart., Izco et M. Costa ex Izco 1976 *corr.* Pérez Raya et al. 1991

Betic (Southern Iberian) ephemeral winter pastures on magnesitic soils

- *Omphalodion brassicifoliae* Rivas-Mart. et al. 1973 (2b)
- *Omphalodion brassicifoliae* Rivas-Mart. et al. ex Izco 1976 (43)
- *Omphalodion linifoliae* Rivas-Mart. et al. 1973 *corr.* G. López 1980 (2b) (*corr.superfl.*)

TRA-02 *Ptilostemono stellati-Vulpietalia ciliatae* Mucina *ined.*

Central and Eastern Mediterranean therophytic swards on shallow sandy and loamy soils over limestone and gypsum substrates

TRA-02A *Vulpio ciliatae-Crepidion neglectae* Poldini 1989

Therophytic swards on disturbed calcareous rubble-rich shallow soils of the Adriatic and Ionian seaboards

- *Hypochaeridion achyrophori* Biondi et Guerra 2008 (5)

TRA-02B *Vulpion ligusticae* Aubert et Loisel 1971

Therophytic grasslands on base-rich shallow soils of the Ligurian-Tyrrhenian seaboards

TRA-02C *Onobrychido-Ptilostemonion stellati* S. Brullo et al. 2001

Therophytic calciphilous herb-rich swards of Calabria and Sicily

tra05 Brullo et al. (2001a) classified this unit within the *Stipo-Bupleuretalia semicompositi*. (LM)

TRA-02D *Xeranthemion annui* Oberd. 1954

Therophyte-rich calciphilous swards in abandoned fields of the Northern Aegean seaboards

TRA-02E *Diantho humilis-Velezion rigidae* Korzhenevskii et Kliukin ex Didukh et Mucina 2014

Therophytic calciphilous swards of submediterranean Crimea

- *Diantho humilis-Velezion rigidae* Korzhenevskii et Kliukin 1990 (5)

TRA-03 *Stipo-Bupleuretalia semicompositi* S. Brullo in S. Brullo et al. 2001

Southern Mediterranean xerophilous and subhalophilous therophytic swards

tra06 This order is closely related to the *Saginetea maritimae* and perhaps best treated in that class. (EB)

- *Stipo-Bupleuretalia semicompositi* S. Brullo 1985

TRA-03A *Plantagini-Catapodion marini* S. Brullo 1985

Tyrrhenian subhalophilous xerophilous therophytic swards

TRA-03B *Dauco-Catananchion luteae* S. Brullo 1985

Siculo-Calabrian subhalophilous therophytic swards on loamy-clayey soils

INTRAZONAL MEDITERRANEAN SEMIDESERTS

PEG *Pegano harmalae-Salsoletea vermiculatae* Br.-Bl. et O. de Bolòs 1958

Mediterranean and Macaronesian semi-desertic halo-nitrophilous scrub in hyperarid coastal habitats

GROUP OF MEDITERRANEAN ORDERS

PEG-01 *Salsolo vermiculatae-Peganetalia harmalae* Br.-Bl. et O. de Bolòs 1954

Mediterranean halo-nitrophilous scrub of semi-desertic inland regions and hyperarid seaboards

- *Atriplicetalia glaucae* Rivas Goday et Rivas-Mart. 1963
- *Onopordo-Salsoletalia vermiculatae* Rivas Goday et Rivas-Mart. 1963
- *Ipomoeetalia purpureae* O. de Bolòs 1988 (2b)

PEG-01A *Salsolo vermiculatae-Peganion harmalae* Br.-Bl. et O. de Bolòs 1954

Meso-supramediterranean halo-nitrophilous scrub on clayey soils of semi-desertic subcontinental regions of the Iberian Peninsula

- *Salsolo-Artemision* Folch 1981

PEG-01B *Haloxylo-Atriplicion* Rivas Goday et Rivas-Mart. ex Rigual 1972

Thermo-mesomediterranean halo-nitrophilous scrub on well-drained soils of the Southern Iberian Peninsula and Maghreb

- *Haloxylo-Atriplicion* Rivas Goday et Rivas-Mart. 1963 (2b)
- *Hammado-Atriplicion* Rivas Goday et Rivas-Mart. ex Rigual 1972 *nom. mut. propos.* (45)

peg01 The formal proposal serving this name change was published by Rivas-Martínez et al. (2002a: 262). (LM)

- *Atriplicion glaucae* Folch 1981 (2b)

PEG-01C *Salsolo oppositifoliae-Suaedion fruticosae* Rigual 1972

Infra-thermomediterranean halo-nitrophilous scrub on clayey soils of arid regions of the Western Mediterranean and the southern regions of the Central Mediterranean

- *Salsolo-Fagonion creticae* Rivas Goday et Rigual 1958
- *Salsolo-Carthamion* Rivas Goday et Rivas-Mart. 1963 (29)
- *Salsolo oppositifoliae-Suaedion mollis* Rigual 1972 *nom. mut. propos.* (45)

peg02 The proposal to mutate the name was published by Rivas-Martínez et al. (2011: 479). (LM)

- *Salsolo oppositifoliae-Suaedion verae* Rigual 1972 *nom. mut. propos.* (45)

peg03 The formal proposal serving this name change was published by Rivas-Martínez et al. (2002a: 276). (LM)

- *Carthamo-Salsolion* Rigual 1972 *nom. invers. propos.* (42)

PEG-01D *Lycio europaei-Ipomoeion purpureae* O. de Bolòs ex Mucina *all. nov. hoc loco*

Thermomediterranean halo-nitrophilous xeric thorny scrub on loamy soils of the Iberian Peninsula

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peg04 De Bolòs (1988: 31) suggested a new alliance, the *Lycio europaei-Ipomoeion purpureae* and classified here the *Pharbitido-Lycietum europaei* (de Bolòs 1962: 176) as the only association; this association serves then automatically as the *holotypus* of the alliance. However, as stated by the IPCN art. 8: "from 1/1/1980 the original diagnosis is sufficient only when the character and/or differential species of the syntaxon are also explicitly indicated." This condition was not met in the protologue of the *Lycio europaei-Ipomoeion purpureae*. Ninot et al. (2012) have also failed to provide such a list of diagnostic taxa and therefore, I here list *Lycium europaeum* and *Ipomoea purpurea* as the diagnostic species of the *Lycio europaei-Ipomoeion purpureae*, and thus validate the alliance name. (LM)

- *Lycio europaei-Ipomoeion purpureae* O. de Bolòs 1988 (8)
- *Ipomoeo purpureae-Lycion europaei* O. de Bolòs 1988 *nom. invers. propos.* (*invers.superfl.*)

peg05 The proposal to invert the name was made by Rivas-Martínez et al. (2011: 248). (LM)

PEG-01E *Artemision arborescentis* Géhu et al. 1986

Thermo-mesomediterranean subnitrophilous coastal scrub of the Southern Apennine Peninsula and Sicily

- *Artemision arborescentis* Géhu et Biondi 1994 (22)

PEG-01F *Atriplici halimi-Suaedion verae* Géhu et al. ex Bergmeier et Dimopoulos 2003

Thermomediterranean halo-nitrophilous scrub on coastal dunes and cliffs of the Eastern Mediterranean

- *Atriplici halimi-Suaedion verae* Géhu et al. 1990 (2b)
- *Cappario siculae-Suaedion verae* de Foucault 2015 (syntax. syn.)

PEG-01G *Medicagini citrinae-Lavaterion arboreae* O. de Bolòs et Vigo in O. de Bolòs et al. 1984

Thermomediterranean ornitho-coprophilous coastal semiarid scrub of the Western Mediterranean

peg06 Rivas-Martínez et al. (2011: 241) suggested classifying this alliance within the *Brassico oleraceae-Lavateretalia arboreae*. See also Remark *cri11*. (LM)

- *Lavaterion maritimae* Rivas-Mart. et al. 2001 (2b)
- *Lavaterion maritimae* Rivas-Mart. et Cantó in Rivas-Mart. et al. 2002 (syntax.syn.)
- *Beto maritimae-Malvion arboreae* de Foucault 2015 (syntax. syn.)

peg07 Rivas-Martínez et al. (2002a: 133–135, 2011: 221) classified this alliance within the '*Parietarietalia*' (*Cymbalario-Parietarietea*). (LM)

PEG-02 *Helichryso stoechadis-Santolinetalia squarrosae* Peinado et Martínez-Parras 1984

Iberian thermo- to oromediterranean subnitrophilous and nitrophilous chamaephytic scrub on degraded soils

PEG-02A *Artemisio glutinosae-Santolinion rosmarinifoliae* M. Costa 1975

Ibero-Atlantic meso- to oromediterranean subnitrophilous and nitrophilous chamaephytic scrub on degraded deep acidic soils

PEG-02B *Santolinion pectinato-canescentis* Peinado et Martínez-Parras 1984

Iberian thermo- to supramediterranean subnitrophilous and nitrophilous chamaephytic scrub on basic degraded soils

GROUP OF MACARONESIAN-SAHARAN ORDERS

PEG-03 *Chenoleetalia tomentosae* Sunding 1972

Infra-thermomediterranean arid low scrub on sandy soils of the Canary Islands and the western seaboards of the Sahara

- *Chenoleoidetalia tomentosae* Sunding 1972 *nom. mut. propos.* (45)

peg08 The formal proposal serving this name change was published by Rivas-Martínez et al. (2002a: 254). This proposal is obsolete since the newest systematic studies in sect. Camphorosmae (Kadereit & Freitag 2011) have confirmed the identity of the name-giving taxon as *Chenoleoides tomentosa* (Lowe) Botsch. (LM)

PEG-03A *Chenoleion tomentosae* Sunding 1972

Infra-thermomediterranean arid low scrub on sandy soils of the Canary Islands

- *Chenoleidion tomentosae* Sunding 1972 *nom. mut. propos.* (45)

peg09 The formal proposal serving this name change was published by Rivas-Martínez et al. (2002a: 255). (LM)

PEG-04 *Forsskaoleo angustifoliae-Rumicetalia lunariae* Rivas-Mart. et al. 1993

Canaro-Madeiran infra-mesomediterranean halo-nitrophilous chamaephytic scrub

- *Nicotiano glaucae-Ricinetalia communis* Rivas-Mart. et al. 1999 (syntax.syn.)

PEG-04A *Artemisio thusculae-Rumicion lunariae* Rivas-Mart. et al. 1993

Canarian infra- to mesomediterranean halo-nitrophilous low scrub of regions of semiarid to subhumid climate

PEG-04B *Launaeo arborescentis-Schizogynion sericeae* Rivas-Mart. et al. 1993

Canarian inframediterranean halo-nitrophilous arid scrub

PEG-04C *Argyranthemo succulenti-Calendulion maderensis* Capelo et al. 2000

Madeiran halo-nitrophilous coastal low scrub

PEG-04D *Nicotiano glaucae-Ricinion communis* Rivas-Mart. et al. 1999

Western Mediterranean and Canarian infra-thermomediterranean arid neophyte-dominated tall scrub

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VEGETATION OF OROMEDITERRANEAN GRASSLANDS AND SCRUB

IND *Festucetea indigestae* Rivas Goday et Rivas-Mart. 1971

Iberian and North African xerophilous silicicolous fescue grasslands in the supra- to cryomediterranean belts

- *Festucetea indigestae* Rivas Goday et Rivas-Mart. in Rivas Goday et Mayor 1966 (3b)

IND-01 *Festucetalia indigestae* Rivas Goday et Rivas-Mart. in Rivas-Mart. 1964

Iberian oro-cryomediterranean xerophilous silicicolous fescue grasslands

ind01 For the reasoning that underpins the name correction, see Rivas-Martínez et al. (2011: 473). However, since *Festuca indigesta* subsp. *curvifolia* is currently recognized as a valid subspecies concept within *F. indigesta* (see www.emplantsbase.org), the name correction does not appear to be necessary. (LM)

- *Festucetalia indigestae* Rivas Goday et Rivas-Mart. in Rivas-Mart. 1963 (2b)
- *Arenario-Festucetalia indigestae* Rivas Goday et Rivas-Mart.1963 (3b)
- *Festucetalia curvifoliae* Rivas Goday et Rivas-Mart. in Rivas-Mart. 1964 *corr*. Izco et Pulgar 2009

IND-01A *Teesdaliopsio confertae-Luzulion caespitosae* Rivas-Mart. 1987

Northern Iberian oro-cryomediterranean xerophilous silicicolous grasslands

IND-01B *Jasionion carpetanae* González-Albo 1941

Central Iberian oro-cryomediterranean xerophilous silicicolous fescue grasslands

ind02 González Albo (1941) has validly described the *Staticetum caespitosae,* the automatic *holotypus* of the alliance *Jasionion carpetanae*. The latter alliance was syntaxonomically identified (by placement into synonymy) as the *Minuartio bigerrensis-Festucion curvifoliae* Rivas-Mart. 1964 *corr*. Rivas-Mart. et al. 2011. The only reason for placement of the *Jasionion carpetanae* into the synonymy was the assumption that the *Jasionion carpetanae* should be considered a *nomen ambiguum* (ICPN art. 37), a case still lacking convincing proof. Interestingly, the *Staticetum caespitosae* has not been listed as one of the associations of the *Minuartio-Festucion curvifolae* by Rivas-Martínez et al. (2011: 268–169) despite otherwise very comprehensive accounts of associations in all alliances handled in the latter paper. Due to lack of proper arguments proving the name *Jasionion carpetanae* illegitimate, technically the latter name remains the valid and current name for this syntaxonomic concept until proven otherwise. (LM)

- *Minuartio juressi-Festucion indigestae* Rivas-Mart. in Rivas Goday et Rivas-Mart. 1963 (2b)
- *Minuartio juressi-Festucion indigestae* Rivas-Mart. 1964 (43)
- *Minuartio juressi-Festucion aragonensis* Rivas-Mart. 1964 *corr*. Rivas-Mart. et al. 1990
- *Minuartio juressi-Festucion curvifoliae* Rivas-Mart. 1964 *corr*. Rivas-Mart. et al. 1999

ind03 Rivas-Martínez et al. (1999) published the formal proposal serving this name change. It appears to be superfluous because of yet another correction (regarding the identity of *Minuartia*) had to be undertaken; see also Remark *ind02*. (LM)

- *Minuartio bigerrensis-Festucion curvifoliae* Rivas-Mart. 1964 *corr*. Rivas-Mart. et al. 2011 (syntax.syn.)

ind04 The proposal of the new correction of the name '*Minuartio juressi-Festucion curvifoliae* Rivas-Mart. 1964 *corr*. Rivas-Mart., Fernández-González et Loidi 1999' has been published by Rivas-Martínez et al. (2011: 475); see also Remark *ind02*. (LM)

IND-01C *Ptilotrichion purpurei* Quézel 1953

Sierra Nevadan (Southern Iberian Peninsula) oro-cryomediterranean, chamaephyte-rich xerophilous silicicolous grasslands

- *Nevadension purpureae* Quézel 1953 *nom. mut. propos.* (*mut.illeg.*)

ind05 The formal proposal serving this name change has been published by Rivas-Martínez et al. (2002a: 269); see also Rivas-Martínez et al. (2011: 268). (LM)

IND-02 *Jasiono sessiliflorae-Koelerietalia crassipedis* Rivas-Mart. et Cantó 1987

Iberian supra-oromediterranean and submediterranean silicicolous grasslands

IND-02A *Hieracio castellani-Plantaginion radicatae* Rivas-Mart. et Cantó 1987

Eastern and Northern Iberian supra-oromediterranean and submediterranean xerophilous silicicolous grasslands

- *Oligo-Bromion* Rivas Goday et Rivas-Mart. 1963 (2b, 3b)
- *Plantagini-Corynephorion* Rivas Goday et Rivas-Mart. 1963 (2b)
- *Oligo-Bromion* Rivas Goday et Rivas-Mart. ex Rivas Goday 1964 (3f)
- *Plantagini-Corynephorion* Rivas Goday et Rivas-Mart. in Rivas-Mart. 1975 (2b)
- *Corynephoro-Plantaginion radicatae* Rivas Goday et Rivas-Mart. ex G. López 1978 (3f)
- *Corynephoro-Plantaginion radicatae* Rivas Goday et Rivas-Mart. in Rivas-Mart. et al. 1984 (3f)
- *Corynephoro-Plantaginion* Rivas Goday et Rivas-Mart. ex Penas et Díaz-González 1985 (5)
- *Agrostio castellanae-Plantaginion radicatae* Rivas Goday ex Rivas-Mart. et Fernández-González 1991 (phantom)

IND-02B *Armerion eriophyllae* Pinto da Silva 1970

Northern Portuguese and Galician grasslands on ultramafic outcrops in the supra-oromediterranean and supra-orotemperate belts

- *Armerion eriophyllae* Pinto da Silva 1965 (1)

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IND-02C *Thymion serpylloidis* Rivas Goday et Rivas-Mart. in Rivas-Mart. 1965

Southern Iberian silicicolous grasslands in the supra-oromediterranean and supra-orotemperate belts

- *Thymion serpylloidis* Rivas Goday et Rivas-Mart.1963 (2b)

PIL *Saginetea piliferae* Gamisans 1975

Relict oromediterranean silicicolous swards of Corsica and Sardinia

- *Saginetea piliferae* Gamisans 1977 (31)

PIL-01 *Saginetalia piliferae* Gamisans 1975

Relict oromediterranean silicicolous swards of Corsica and Sardinia

- *Saginetalia piliferae* Gamisans 1977 (31)

PIL-01A *Sesamoido pygmaeae-Poion violaceae* Gamisans 1975

Relict oromediterranean silicicolous swards of Corsica and Sardinia

- *Caricion caryophyllaeae* Gamisans 1975 (syntax.syn.)
- *Sedo alpestris-Phleion brachystachyos* Gamisans 1975 (syntax.syn.)
- *Sesamoido pygmeae-Bellardiochloion variegatae* Gamisans 1975 *nom. mut. propos.* (45)

pil01 The taxon name *Poa violacea* Bellardi has not been used in major European floras for the past 20 years and therefore the mutation of the name, *Bellardiochloa variegata* (Lam.) Kerguélen, appears as appropriate. (LM)

- *Caricion caryophyllaeae* Gamisans 1977 (31)
- *Sedo alpestris-Phleion brachystachyos* Gamisans 1977 (31)
- *Sesamoido pygmaeae-Poion violaceae* Gamisans 1977 (31)

RUM *Rumici-Astragaletea siculi* Pignatti et Nimis in E. Pignatti et al. 1980

Siculo-Calabrian oromediterranean and upper mesomediterranean pulvinate scrub and related grasslands on siliceous substrates

rum01 The content of this class was considered by Rivas-Martínez et al. (2011: 311) as a part of the *Cisto-Lavanduletea,* but no new evidence of this was submitted. (LM)

- *Cerastio-Carlinetea nebrodensis* S. Brullo 1983 (2b)
- *Cerastio-Carlinetea nebrodensis* S. Brullo 1984 (syntax.syn.)

RUM-01 *Rumici-Astragaletalia siculi* Pignatti et Nimis in E. Pignatti et al. 1980

Upper meso- to oromediterranean xeric scrub on siliceous volcanic substrates of Sicily

- *Astragaletalia siculae* Giacomini et Gentile 1961 (3b)
- *Astragaletalia siculae* Giacomini ex Poli 1965 (3b)

RUM-01A *Rumici-Astragalion siculi* Poli 1965

Oromediterranean xeric pulvinate scrub on siliceous volcanic substrates of Etna (Sicily)

rum02 Biondi (2000: 129) preferred to classify this syntaxonomic concept within the *Carici-Genistetalia lobelii* Klein 1972 and further within the *Rosmarinetea.* (LM)

RUM-01B *Armerion nebrodensis* S. Brullo 1984

Upper meso-oromediterranean silicicolous pulvinate scrub and related grasslands of Nebrodi (Sicily)

RUM-02 *Anthemidetalia calabricae* S. Brullo et al. 2001

Upper meso- to oromediterranean silicicolous pulvinate scrub and related grasslands of Calabria

RUM-02A *Koelerio brutiae-Astragalion calabrici* Giacomini et Gentile ex S. Brullo et al. 2005

Mesomediterranean silicicolous pulvinate scrub and related grasslands of Sila (Calabria)

rum03 This unit has experienced a turbulent past regarding its syntaxonomic position (e.g. Giacomini & Gentile 1961; Barbero & Bonin 1969; Bonin 1978; Pignatti et al. 1980; de Foucault 1994; Brullo et al. 2004). As presented in our paper, this concept follows the syntaxonomic synthesis by Brullo et al. (2004). (LM)

- *Koelerio-Astragalion calabrici* Giacomini et Gentile 1961 (2b)
- *Koelerio-Astragalion calabri* Giacomini et Gentile 1966 (2b)
- *Koelerio-Astragalion calabri* Giacomini et Gentile ex S. Brullo in S. Brullo et al. 2004 (5)

RUM-02B *Armerion aspromontanae* S. Brullo et al. 2001

Mesomediterranean silicicolous pulvinate scrub and related grasslands of Aspromonte (Calabria)

ANA *Trifolio anatolici-Polygonetea arenastri* Quézel 1973

Oromediterranean, slightly chionophilous mat-grass swards of Eastern Anatolia, Sterea Hellas, Southern Macedonia and Bulgaria

ana01 The oromediterranean chionophilous mat-grass swards of the *Trifolio-Polygonetea* (Quézel 1973) are an ecological analogon to the *Salicetea herbaceae*, yet occurring at high altitudes of mountain ranges embedded within the Eastern Mediterranean or in some marginal ranges surrounded by the submediterranean regions of the southwestern Balkans (Rila, Pirin, and possibly also some high mountain ranges of Macedonia). This vegetation occurs in depressions carrying snow cover longer than the surrounding alpine and/or oromediterranean grasslands, yet due to shallow, skeletal soils the habitats appear extremely dry during high-radiation summer. The ecological and geographical optimum of this class is in Anatolia (Turkey) but marginally some communities are reaching Europe, especially in Sterea Hellas and in the Macedonian-Bulgarian-Hellenic border triangle. The *Trifolion parnassi* (*Trifolietalia parnassi;* Quézel 1964), formerly classified within the

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Juncetea trifidi (or '*Caricetea curvulae*'), belongs here as well as some communities with *Alopecurus gerardi* misplaced in the *Salicetea herbaceae* (e.g. *Omalotheco-Alopecuretum gerardi* Mucina et al. 1990). Some other communities listed as belonging to the *Trifolio-Polygonetea*, for instance by Lovrić & Rac (1989), do not qualify (see Mucina in Chytrý et al. 2015). At this stage, I fail to recognize the virtue of considering the *Trifolio-Polygonetea* as synonymous to the Anatolian *Astragalo-Brometea* as suggested by Parolly (2004). The taxonomic identity of '*Polygonum arenastrum*' (one of the eponymous species) should be challenged. (LM)

ANA-01 *Trifolietalia parnassii* Quézel 1964

Oromediterranean slightly chionophilous mat-grass swards of Sterea Hellas, Southern Macedonia and Bulgaria

- *Trifolietalia parnassii* Quézel in Quézel et al. 1992 (phantom)
- *Trifolio anatolicae-Polygonetalia arenastri sensu* Lovrić et Rac 1989, non Quézel 1973 (pseudonym)

ANA-01A *Trifolion parnassii* Quézel 1964

Oromediterranean slightly chionophilous mat-grass swards of Sterea Hellas, Southern Macedonia and Bulgaria

- *Trifolion parnassii* Quézel in Quézel et al. 1992 (phantom)

ONO *Festuco hystricis-Ononidetea striatae* Rivas-Mart. et al. 2002

Submediterranean submontane-montane and oromediterranean dry grasslands and related dwarf scrub on calcareous substrates of the Iberian Peninsula, the Western Alps and the Apennines

ono01 This class replaces the *Elyno-Seslerietea* at high altitudes of the submediterranean zone (supratemperate belts) of the Cantabrian Mountains, Pyrenees, Western Alps, central Apennine Peninsula and Sicily as well as in analogous meso- and oromediterranean altitudinal belts of the Mediterranean mountain ranges of the Northern Iberian Peninsula, southern regions of the Apennine Peninsula and Sicily. The inclusion of the Apennine and Sicilian units within this class is unprecedented. (LM)

- *Festucetea hystricis* Mayor in Mayor et al. 1982 (2b)
- *Festuco hystricis-Ononidetea striatae* Rivas-Mart. et al. 1991 (2b)

ONO-01 *Festuco hystricis-Poetalia ligulatae* Rivas Goday et Rivas-Mart. 1963

Supra-oromediterranean dry calcicolous grasslands and low scrub of the northern and central regions of the Iberian Peninsula and Maghreb

ONO-01A *Festucion burnatii* Rivas Goday et Rivas-Mart. ex Mayor et al. 1973

Cantabrian submediterranean montane-subalpine grasslands on calcareous lithosols

ONO-01B *Sideritido fontquerianae-Arenarion microphyllae* Rivas Goday et Borja 1961 *corr.* Rivas-Mart. et al. 2002

Castilian-Oroiberian supra-oromediterranean grasslands on calcareous and ultramafic soils

ono02 In the name '*Sideritido pulvinatae-Arenarion aggregatae* Rivas Goday et Borja 1961', Rivas-Martínez et al. (2002a: 244) corrected both name-giving taxa, namely '*Sideritis glacialis* var. *pulvinata* Font Quer' (*recte: Sideritis glacialis* Boiss.; var. *pulvinata* is a *nomen nudum*) and *Arenaria aggregata* subsp. *erinacea* Boiss., by *S. glacialis* subsp. *fontqueriana* Obón & D. Rivera and *A. aggregata* subsp. *microphylla* (Pau) Riv.-Mart. & Costa, respectively. (JPT, HW, RG, LM) Valls (2003: 146) suggested classifying this alliance within the *Thero-Brachypodietalia*. (LM, JPT)

- *Sideritido pulvinatae-Arenarion aggregatae* Rivas Goday et Borja 1961 (orig.form) (43)
- *Minuartio-Poion ligulatae* O. de Bolós 1962 (syntax.syn.)
- *Festuco hystricis-Poion ligulatae* Rivas Goday et Rivas-Mart. 1963 (syntax.syn.)
- *Sideritido fontquerianae-Arenarion aggregatae* Rivas Goday et Borja 1961 *corr.* Rivas-Mart. et al. 2001 (43)

ono03 In the name '*Sideritido pulvinatae-Arenarion aggregatae* Rivas Goday et Borja 1961', the name-giving taxon '*Sideritis glacialis* var. *pulvinata* Font Quer' (*recte: Sideritis glacialis* Boiss.; var. *pulvinata* is a *nomen nudum*) was replaced (corrected) by *Sideritis glacialis* subsp. *fontqueriana* Obón & D. Rivera by Rivas-Martínez et al. (2001). (JPT, HW, RG, LM)

ONO-01C *Plantagini discoloris-Thymion mastigophori* Molina et Izco 1989

Cantabrian and Castilian supramediterranean low scrub on calcareous soils

ono04 For analysis of the nomenclature of this alliance see Molina & Izco (1989). (LM)

- *Festuco hystricis-Thymion mastigophori* Izco et Molina in Molina 1984 (2b)
- *Helianthemo cani-Thymion mastigophori* Loidi et Fernández Prieto 1987

ONO-01D *Seselio granatensis-Festucion hystricis* Rivas-Mart. in Rivas-Mart. et al. 2011

Betic (Southern Iberian) supra-oromediterranean low scrub on calcareous lithosols

ONO-02 *Ononidetalia striatae* Br.-Bl. et al. 1952

Submediterranean submontane-montane dry calcicolous grasslands and related dwarf scrub of the Western Alps, the Pyrenees and the Cantabrian Mountains

ono05 Two large-scale syntaxonomic overviews by Theurillat et al. (1995: Alps) and Bardat et al. (2004: France) from the main distribution range of this vegetation type support

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the proposal of Royer (1991) to classify the *Ononidetalia striatae* within the *Festuco-Brometea*. (JD, LM)

- *Seslerietalia galloprovincialis* Molinier 1934 (2b)
- *Genisto-Ononidetalia striatae* Br.-Bl. et Susplugas 1937 (3f)
- *Ononidetalia striatae* Br.-Bl. in Br.-Bl. et al. 1947 (2b)
- *Ononidetalia striatae* Br.-Bl. 1950 (2b)
- *Astragaletalia sempervirentis* Barbero 1968 (syntax.syn.)

ono06 Barbero (1968) included the *Avenion montanae* Barbero 1968 (with the *Seslerio-Avenetum montanae* Barbero 1968) and the *Avenion sempervirentis* Barbero 1968 (with the *Centaureo triumfettii-Avenetum sempervirentis* Barbero 1968 and the *Festucetum dimorphae* Barbero 1968) within this order. (JPT)

- *Anthyllidetalia montanae* Quézel 1971 (29)

GRASSLAND GROUP OF ALLIANCES

ONO-02A *Ononidion striatae* Br.-Bl. et Susplugas 1937

Submediterranean montane dry calcicolous grasslands of the Western Pyrenees and the Catalano-Valencian region

ONO-02B *Ononidion cristatae* Royer 1991

Submediterranean montane dry calcicolous grasslands of the southwestern Western Alps

ONO-02C *Festucion scopariae* Br.-Bl. 1948

Submediterranean montane to subalpine calcicolous dry pastures of the Central and Eastern Pyrenees

- *Festucion gautieri* Br.-Bl. 1948 *nom. mut. propos.* (45)

ono07 The formal proposal serving this name change was published by Rivas-Martínez et al. (2002a: 260). (LM)

- *Saponarion caespitosae* P. Montserrat et Villar 1987 (syntax.syn.)

ONO-02D *Avenion sempervirentis* Barbero 1968

Submediterranean montane dry calcicolous grasslands of the Maritime and Ligurian Alps

ono08 These communities form a syntaxonomic transition between the *Elyno-Seslerietea* and the *Festuco hystricis-Ononidetea striatae*. (JPT, LM)

- *Avenion montanae* Barbero 1968 (syntax.syn.)
- *Helictotrichion sempervirentis* Barbero 1968 *nom. mut. propos.* (45)
- *Helictotrichion sedenensis* Barbero 1968 *nom. corr. propos.* (*corr.illeg*)

ono09 The *Avenion montanae* Barbero 1968 is based on *Avena sempervirens* Vill. The correction of this syntaxon name into the *Helictotrichion sedensis* would be justified only if it is proven that *Avena sempervirens* Vill. has been mistaken for *Helictotrichon sedenense* (DC.) Holub. (JPT)

- *Ononidion cenisiae* Barbero 1968 (3b)

ono10 Bardat et al. (2004) used this alliance name for communities that Barbero et al. (1972) attributed to the *Ononidion striatae* Br.-Bl. et Susplugas 1937. (JPT)

- *Ononidion cenisiae* Barbero 1970 (phantom)
- *Astragalion aristati* Archiloque et al. 1971 (syntax.syn.)

GARRIGUE GROUP OF ALLIANCES

ONO-02E *Genistion lobelii* Molinier 1934

Submediterranean submontane-montane calcicolous low scrub of Provence, the Cevennes and the Catalano-Valencian region

- *Globularion cordifoliae* Guinochet 1938 (phantom)
- *Seslerion mediterraneo-montanum* Vanden Berghen 1963 (34)
- *Seslerion elegantissimae* Quézel 1971 (29)
- *Globularion cordifoliae* Allier et Ritter 1971 (syntax.syn.)
- *Potentillion velutinae* Barbero et al. 1972 (29)
- *Genistion lobelii-villarsii-pulchellae* Lavagne et Rebuffel 1998 (10a, 29)

ONO-02F *Echinospartion horridi* Rivas-Mart. et al. 1991

Submediterranean montane-subalpine calcicolous low scrub of the Aragonian region of the Pyrenees

ONO-02G *Genistion occidentalis* Rivas-Mart. in Rivas-Mart. et al. 1984

Submediterranean Cantabro-Castilian submontane to subalpine calcicolous low scrub

ONO-02H *Lavandulo angustifoliae-Genistion cinereae* Barbero et al. 1972

Supramediterranean calcicolous low scrub of Southern France

ONO-03 *Erysimo-Jurineetalia bocconei* S. Brullo 1984

Submediterranean xeric calcicolous grasslands on skeletal soils of the Apennine Peninsula and in the oromediterranean belt of Sicily

- *Brometalia caprini* Ubaldi 1997 (5)

ono11 The *Brometalia caprini* is an order described (invalidly) by Ubaldi (1997) originally included in the *Cerastio-Carlinetea nebrodensis* and subsequently re-classified by its author into the *Daphno-Festucetea* (Ubaldi 2003) and later into the *Festuco-Brometea* (Ubaldi 2011). It is a rather ambiguous syntaxon which has an intermediate character between a garrigue and dry grassland, and which is characterized by species having different ecological and biogeographic features. (RDP, LM)

- *Festuco-Seslerietalia nitidae* Ubaldi 2003 (3g)
- *Valeriano tuberosae-Festucion circummediterraneae* Ubaldi 2003 (2b)
- *Asphodelino liburnicae-Brometalia erecti* Ubaldi 2011 (2b)
- *Euphorbietalia myrsinitis* Ubaldi 2011 (syntax.syn.)
- *Artemisio albae-Saturejetalia montanae* (Allegrezza et al. 1997) Biondi et Allegrezza in Biondi et al. 2014 (syntax.syn.)

ono12 The placement of this vegetation into the *Festuco-Ononidetea* is unique in this paper. It has been, however, motivated by Biondi et al.'s (2014) correct observation that the *Artemisio albae-Saturejetalia montanae* is a geographic analogon (rather than 'vicariant') to the *Ononidetalia striatae*. Indeed, the *Artemisio albae-Saturejetalia montanae* take bioclimatically (ecologically) and floristically

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a transitional position between the *Festuco-Brometea* and the mediterranean garrigues either of the *Rosmarinetalia* or the *Cisto-Ericetalia*, an issue still to be established beyond doubt. (LM)

- *Phleo ambigui-Brometalia erecti* Biondi, Allegrezza, Blasi & Galdenzi in Biondi et al. 2014 (syntax.syn.)

ono13 Biondi et al. (1995) described the *Phleo ambigui-Bromion erecti* invalidly (ICPN arts. 2b, 5). In this alliance the authors included the *Lino punctati-Seslerietum nitidae* Pignatti et Nimis in Pignatti et al. 1980 that was selected by Pignatti et al. (1980) to serve as the *typus* of the *Cerastio-Astragalion nebrodensis* (*nom inval.*; ICPN art. 5). Brullo (1984) validated the name *Cerastio-Astragalion nebrodensis* and kept the *Lino-Seslerietum* as the nomenclature type of the alliance. In the same paper the author proposed the *Erysimo-Jurineetalia bocconei* for the grasslands of high mountains of Northern Sicily and designated the validated *Cerastio-Astragalion nebrodensis* as the nomenclature type of the order. The *Phleo ambigui-Brometalia erecti* (Biondi et al. 2014) is typified by the *Phleo ambigui-Bromion erecti* Biondi & Blasi ex Biondi & Galdenzi 2012 that refers to the *Phleo ambigui-Bromion erecti* Biondi et al. 1995. Biondi et al. (1995) included the *Lino-Seslerietum* in the alliance *Phleo-Bromion* and, as a consequence, the *Phleo ambigui-Brometalia erecti* Biondi, Allegrezza, Blasi & Galdenzi in Biondi et al. 2014 should be considered a syntaxonomic synonym of the *Erysimo-Jurineetalia bocconei* Brullo 1984. (RDP, LM, M. Terzi)

ONO-03A *Alyssion bertolonii* E. Pignatti et Pignatti 1977

Meso-supramediterranean ultramafic scrub of Northern Tuscany, Liguria and the Northern Apennines

- *Euphorbion ligusticae* Nowak 1987 (syntax.syn.)
- *Armerio denticulatae-Stipion etruscae* Ubaldi 2013 (syntax. syn.)

ONO-03B *Cytiso spinescentis-Saturejion montanae* Pirone et Tammaro 1997

Submediterranean montane dry calciphilous grasslands rich in dwarf shrubs of the Central Apennines

ono14 Alegrezza et al. (1997) and Pirone & Tammaro (1997) described (in the same issue of the journal Fitosociologia) two alliances that I consider to be syntaxonomically identical. The *Cytiso spinescentis-Saturejion montanae* Pirone et Tammaro 1997 takes priority over the *Artemisio albae-Saturejion montanae* Allegrezza et al. 1997 as the former was published in a paper preceding the latter. (LM)

- *Artemisio albae-Saturejion montanae* Allegrezza et al. 1997 (syntax.syn.)

ONO-03C *Cytiso spinescentis-Bromion erecti* Bonin 1978

Submediterranean xeric calciphilous open grasslands in the submontane and lower montane belts of the Central and Southern Apennines

ono15 See Di Pietro (2011) for details on the nomenclatural issues surrounding the effective publication and validity of the *Cytiso spinescentis-Bromion erecti* Bonin 1978. (RDP, LM)

- *Cytiso spinescentis-Bromion caprini* Bonin in Barbero et Bonin 1969 (2b)
- *Crepido lacerae-Phleion ambigui* Biondi et Blasi 1982 (5)
- *Phleo ambigui-Bromion erecti* Biondi et al. 1995 (2b, 5)
- *Sideritidion italicae* (Biondi et al. 1995) Ubaldi 2011 (25) (syntax.syn.)
- *Phleo ambigui-Bromion erecti* Biondi et al. ex Biondi et Galdenzi 2012 (syntax.syn.)

ono16 Biondi & Galdenzi (2012) included the *Seslerio nitidae-Brometum erecti* Bruno et Covarelli 1968 (the *typus* of the *Seslerio nitidae-Caricion macrolepidis* Ubaldi 1997) into the validated *Phleo ambigui-Bromion erecti* and therefore the older name *Seslerio nitidae-Caricion macrolepidis* Ubaldi 1997 has the priority over the '*Phleo ambigui-Bromion erecti' sensu* Biondi & Galdenzi (2012). (RDP, LM)

ONO-03D *Seslerio nitidae-Caricion macrolepidis* Ubaldi 1997

Submediterranean upper-montane and subalpine xeric calciphilous grasslands on shallow soils of the Central and Southern Apennines

- *Cerastio tomentosi-Globularion meridionalis* Ciaschetti et al. 2015 (syntax.syn.)
- *Knautio calycinae-Bromion caprini* Ubaldi 2008 (8)
- *Knautio calycinae-Bromion caprini* Ubaldi 2011 (syntax. syn.)
- *Carici humilis-Seslerion apenninae* Biondi et Allegrezza in Biondi et al. 2014 (syntax.syn.)

ONO-03E *Cerastio-Astragalion nebrodensis* Pignatti et Nimis ex S. Brullo 1984

Submediterranean xeric open calciphilous grasslands on rocky soils of the Southern Apennines and in the oromediterranean belt of Sicily

- *Cerastio-Astragalion nebrodensis* Pignatti et Nimis in E. Pignatti et al. 1980 (5)

GEN *Carici-Genistetea lobelii* Klein 1972

Cyrno-Sardean oromediterranean cushion-tragacanthic scrub and related grasslands

gen01 Arrigoni (1986) extended this class by the addition of scrub occurring in the meso- and supra-mediterranean belts (900–1500 m) of Sardinia, and coined a new order for this vegetation, the *Teucrio-Santolinetalia* Arrigoni 1986. However, the alliances included in this order, namely the *Armerio sardoae-Genistion salzmannii* Arrigoni 1986 (siliceous substrates) and the *Polygalo-Seslerion insularis* Arrigoni ex Arrigoni et Di Tommaso 1986 (calcareous substrates) show more floristic (and ecological) links to the *Lavanduletalia stoechadis* (*Cisto-Lavanduletea*) and to the *Rosmarinetalia* (*Rosmarinetea*), respectively, rather than to

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the endemic-rich *Carici-Genistetea* and have been therefore excluded from the latter class and accommodated elsewhere. The content of this class is considered by Rivas-Martínez et al. (2011: 311) as a part of the *Cisto-Lavanduletea* but without submitting new evidence to support his claim. (LM)

- *Carlinetea macrocephalae* Gamisans 1975 (29)

GEN-01 *Carici-Genistetalia lobelii* Klein 1972

Cyrno-Sardean oromediterranean cushion-tragacanthic scrub and related grasslands

- *Carlinetalia macrocephalae* Gamisans 1977 (29, 31)
- *Carici caryophylleae-Genistetalia salzmannii* Klein 1972 *nom. mut. propos.* (*mut.illeg.*)

GEN-01A *Anthyllidion hermanniae* Klein 1972

Cyrno-Sardean oromediterranean cushion-tragacanthic scrub on exposed and windy crests

- *Junipero-Astragalion genargentei* Ubaldi 2011 (syntax.syn.)

GEN-01B *Plantaginion insularis* Klein 1972

Cyrno-Sardean oromediterranean grasslands in snow-carrying depressions

- *Plantaginion insularis* Gamisans 1968 (1)
- *Sedo-Phleion brachystachyos* Gamisans 1975 (syntax.syn)

DAP *Daphno-Festucetea* Quézel 1964

Xeric oromediterranean grasslands and cushion-tragacanthic scrub on calcareous and ultramafic substrates of the Hellenic mainland and the Aegean region

dap01 Festuca varia (sensu lato) is reported to occur in Hellas (Strid and Kit Tan 1991: 753). *F. varia* Haenke in Jacq. is an endemic species of the Central Alps (Wallosek 1999). The taxon occurring in the *Daphno-Festucetea* vegetation is most probably (and in most cases) *F. cyllenica* Boiss. & Heldr. However, taxa such as *F. graeca* (Hack.) Markg.-Dann., *F. penzesii* (Acht.) Markg.-Dann. and *F. kozanensis* Foggi et al. might also occur here. Until the taxonomy of this taxonomically complex group stabilizes, we prefer use of the class name in its current, uncorrected form. (EB, LM)

- *Astragaletea cretici* Zohary et Orshan 1966 (2b)
- *Berberido-Asperuletea* Zaffran 1971 (2b)
- *Acantholimo-Astragaletea* Voliotis 1973 (2b)
- *Astragaletea mediterranea* Zohary 1973 (2b)
- *Saturejetea spinosae* Zaffran 1982 (1)
- *Saturejetea spinosae* Zaffran 1990 (5)

DAP-01 *Daphno-Festucetalia* Quézel 1964

Xeric oromediterranean grasslands and cushion-tragacanthic scrub on calcareous and ultramafic substrates of the Hellenic mainland and the Peloponissos

dap02 The summit vegetation within the *Astragalus angustifolius* on the Aegean island of Lesvos could also be classified in the *Daphno-Festucetalia*. It is putatively similar to the Anatolian oromediterranean grasslands and might be considered a different alliance (or order). The oromediterranean grasslands and thorn cushion vegetation on Evvia (Euboea) should also belong to the *Daphno-Festucetalia*. (EB) See also nomenclatural Remark *dap01*. (LM)

- *Acantholimo-Astragaletalia* Horvat 1954 (2b)
- *Centaureetalia idaeae* Zaffran 1990 (1)

DAP-01A *Astragalo angustifolii-Seslerion coerulantis* Quézel 1964

Oromediterranean xeric grasslands and cushion-tragacanthic scrub on calcareous substrates of the Hellenic mainland

dap03 The name would possibly undergo a nomenclature correction, as it is highly improbable that the name-giving species in the protologue is indeed *Sesleria coerulans* Friv. (LM)

DAP-01B *Eryngio multifidi-Bromion fibrosi* Quézel 1964

Oromediterranean xeric grasslands and cushion-tragacanthic scrub on ophiolitic substrates of the Hellenic mainland

DAP-01C *Stipo pulcherrimae-Morinion persicae* Quézel 1964

Oromediterranean xeric grasslands on calcareous substrates of the Peloponissos

DAP-02 *Saturejo spinosae-Scutellarietalia hirtae* Dimopoulos et al. ex Bergmeier 2002

Xeric and subxeric oromediterranean grasslands and cushion-tragacanthic scrub on calcareous and ultramafic substrates of Crete

- *Centaureetalia idaeae* Zaffran 1990 (5)
- *Saturejo spinosae-Scutellarietalia hirtae* Dimopoulos et al. 1997 (2b, 5)

DAP-02A *Astragalion cretici* Bergmeier 2002

Xeric oromediterranean calcicolous cushion-tragacanthic scrub of Central and Eastern Crete

- *Astracanthion creticae* Zaffran 1990 (5)

DAP-02B *Verbascion spinosi* Zaffran ex Bergmeier 2002

Xeric oromediterranean calcicolous cushion-tragacanthic scrub of Western Crete

- *Verbascion spinosi* Zaffran 1990 (5)

DAP-02C *Colchico cretensis-Cirsion morinifolii* Bergmeier 2002

Subxeric oromediterranean swards and grasslands on stony soils of grazed dolines on high plateaus of Crete

CYP *Diantho troodi-Teucrietea cyprii* S. Brullo et al. 2005

Oromediterranean scrub on ultramafic substrates of Cyprus

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CYP-01 *Diantho troodi-Teucrietalia cyprii* S. Brullo et al. 2005
Oromediterranean scrub on ultramafic substrates of Cyprus
CYP-01A *Hyperico stenobotryos-Alyssion troodi* S. Brullo et al. 2005
Oromediterranean scrub on ultramafic substrates of Cyprus

VEGETATION OF THE CANARY ISLANDS, MADEIRA AND AZORES

ZONAL CLASSES OF THE CANARY ISLANDS, MADEIRA AND AZORES

KLE *Kleinio neriifoliae-Euphorbietea canariensis* (Rivas Goday et Esteve 1965) Santos 1976
Macaronesian and Western Maghrebinian succulent tabaibal and cardonal on semi-desert lava beds
- *Crassi-Euphorbietea macaronesica* Rivas Goday et Esteve 1965 (orig.form) (34a)
- *Echino-Euphorbietea macaronesica* Rivas Goday 1960 (34a)
- *Diacanthio-Euphorbietea macaronesica* Rivas Goday et Esteve 1965 (34a)
- *Kleinio-Euphorbietea macaronesica* Sunding 1972 (34a)

KLE-01 *Kleinio neriifoliae-Euphorbietalia canariensis* (Rivas Goday et Esteve 1965) Santos 1976
Macaronesian and Western Maghrebinian succulent tabaibal and cardonal on semi-desert lava beds
- *Diacantho-Euphorbietalia canariensis* Rivas Goday 1960 (2b)
- *Euphorbietalia macaronesica* Rivas Goday et Esteve 1965 (34a)
- *Kleinio neriifoliae-Euphorbietalia macaronesica* Oberd. 1965 (3b)

KLE-01A *Aeonio-Euphorbion canariensis* Sunding 1972
Canarian-Salvagenian primary succulent tabaibal and cardonal on semi-desert lava beds
- *Euphorbion regis-jubae* Rivas Goday 1960 (2b)
- *Kleinio neriifoliae-Euphorbion canariense* Rivas Goday et Esteve 1965 (orig. from) (34a)
- *Kleinio neriifoliae-Euphorbion canariensis* Oberd. 1965 (3b)
- *Helianthemo canariensis-Euphorbion canariensis* Sunding 1972 (syntax.syn.)
- *Helianthemo-Euphorbion balsaminiferae* Sunding 1972 (syntax.syn.)
- *Kleinio neriifolioae-Euphorbion canariensis* (Rivas Goday et Esteve 1965) Santos 1976 (syntax.syn.)

kle01 According to Rivas-Martínez et al. (2011: 395) the valid name of this alliance is the *Kleinio neriifoliae-Euphorbion canariensis* (Rivas Goday et Esteve 1965) Santos 1976. There are, however, three other syntaxonomic concepts (all cited in synonymy of the *Kleinio neriifoliae-Euphorbion canariensis*) in the paper cited above, that carry valid names and had been published earlier by Sunding (1972): the *Aeonio-Euphorbion canariensis*, the *Helianthemo canariensis-Euphorbion canariensis*, and the *Helianthemo-Euphorbion balsaminiferae*. (LM)
- *Kleinio neriifoliae-Euphorbion canariensis* (Rivas Goday et Esteve 1965) Santos 1977 (31)

KLE-01B *Euphorbion regis-jubo-lamarckii* Rivas-Mart., Wildpret, O. Rodríguez et Del Arco in Rivas-Mart. et al. 2011
Canarian seral succulent tabaibal and cardonal on semi-desert lava beds

OLE *Oleo cerasiformis-Rhamnetea crenulatae* Santos ex Rivas-Mart. 1987
Macaronesian infra-thermomediterranean semiarid and arid matorral, sparse palm groves and associated low scrub on volcanic substrates
- *Oleo cerasiformis-Rhamnetea crenulatae* Santos 1976 (2b)
- *Rhamno crenulatae-Oleetea cerasiformis* Santos ex Rivas-Mart. 1987 *nom. invers. propos.* (42)

ole01 The inversion of the name was proposed by Rivas-Martínez et al. (2011: 398), but without proper justification. (LM)
- *Cisto monspeliensis-Micromerietea hyssopifoliae* Pérez de Paz et al. 1990 (syntax.syn.)

OLE-01 *Oleo cerasiformis-Rhamnetalia crenulatae* Santos 1983
Macaronesian infra-thermomediterranean semiarid matorral and palm groves on volcanic substrates
- *Rhamno crenulatae-Oleetalia cerasiformis* Santos 1983 *nom. invers. propos.* (42)

ole02 The inversion of the name was proposed by Rivas-Martínez et al. (2011: 398), but without proper justification. (LM)

OLE-01A *Mayteno canariensis-Juniperion canariensis* Santos et F. Galván ex Santos 1983 *corr.* Rivas-Mart. et al. 1993
Canarian semiarid matorral on deep soils over volcanic substrates
- *Rhamnion crenulatae* Wildpret et Barquín in Santos 1976 (2b)
- *Mayteno canariensis-Juniperion canariensis* Santos et F. Galván 1980 (2b)
- *Mayteno canariensis-Juniperion phoeniceae* Santos et F. Galván ex Santos 1983 (43)

OLE-01B *Retamion rhodorhizoidis* Del Arco et al. 2009
Western Canarian infra-thermomediterranean retamal on volcanic substrates

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OLE-01C *Oleo maderensis-Maytenion umbellatae* Capelo et al. 2000

Madeirean infra-thermomediterranean matorral on deep soils over volcanic substrates

- *Aeonio-Lytanthion* Sunding 1972
- *Oleo cerasiformis-Maytenion umbellatae* Capelo et al. 2000 *nom. mut. propos. et nom. invers. propos.* (42, 45)

OLE-01D *Phoenicion canariensis* Rivas-Mart. et Del Arco in Rivas-Mart. et al. 2011

Canarian semiarid sparse palm woodland on deep colluvial soils over volcanic substrates

OLE-02 *Cisto canariensis-Micromerietalia hyssopifoliae* Pérez de Paz et al. 1990 *corr.* Rivas-Mart. in Rivas-Mart. et al. 2011

Macaronesian infra-thermomediterranean semiarid seral tomillar, jaral and related scrub on shallow volcanic soils

- *Micromerio hyssopifoliae-Cistetalia canariensis* Pérez de Paz et al. 1990 *corr*. Rivas-Mart. in Rivas-Mart. 2011 *nom. invers. propos* (42)

ole03 The correction of the name is based (according to Rivas-Martínez et al. 2011: 401, 474–475) on the taxonomic identity of the Canarian populations of *Cistus monspelliensis*, which should be considered a separate subspecies (*C. monspelliensis* subsp. *canariensis* Rivas-Mart., Martín Osorio & Wildpret) to *C. monspelliensis* subsp. *monspelliensis*, which occurs in the Mediterranean. It appears that recognition of the Canary island populations as a separate taxonomic entity is warranted, as supported also by phylogeographic studies by Fernández-Mazuecos & Vargas (2011) who identified 10 endemic haplotypes as opposed to only one haplotype in the Mediterranean proper within *Cistus monspelliensis*. The inversion of the name also proposed in the paper cited above is not explained, but it appears acceptable as most of the associations in the only alliance (*Micromerio-Cistion*) are dominated by taller-grown *Cistus monspelliensis*. (LM)

- *Cisto monspeliensis-Micromerietalia hyssopifoliae* Pérez de Paz et al. 1990 *nom. mut. propos*. (45)
- *Micromerio hyssopifoliae-Cistetalia monspeliensis* Pérez de Paz et al. 1990 *nom. invers. propos.* (42)

OLE-02A *Cisto monspeliensis-Micromerietalia hyssopifoliae* Pérez de Paz et al. 1990

Canarian semiarid seral tomillar and jaral on shallow volcanic soils

- *Cisto canariensis-Micromerion hyssopifoliae* Pérez de Paz et al. corr. Rivas-Mart. in Rivas-Mart. et al. 2011 (43)
- *Micromerio hyssopifoliae-Cistion monspeliensis* Pérez de Paz et al. 1990 *nom.invers.propos.* (42)

OLE-02B *Soncho ustulati-Artemision argenteae* Capelo et al. 2000

Madeirean semiarid seral tomillar and related low scrub on shallow volcanic soils

LAU *Pruno lusitanicae-Lauretea azoricae* Oberd. ex Rivas-Mart. et al. 1977

Macaronesian evergreen laurisilva forests and related seral matorral

lau01 This class comprises traditionally both seral scrub (*Andryalo pinnatifidae-Ericetalia arboreae*) and mature forest (*Pruno-Lauretalia azoricae*) vegetation. Undoubtedly, these units share many species, however the contrasting physiognomy, ecology (functioning) and syndynamic position of both orders does not match the modern view of the concept of class and therefore, this classification should be subject to a revision. (LM)

- *Pruno lusitanicae-Lauretea azoricae* Oberd. 1960 (2b)
- *Pruno lusitanicae-Lauretea azoricae* Oberd. 1965 (2b)
- *Pruno hixae-Lauretea novocanariensis* Oberd. 1965 *corr.* Rivas-Mart. et al. 2001 (2b, *corr.superfl.*)
- *Pruno hixae-Lauretea novocanariensis* Oberd. 1965 *corr*. Rivas-Mart. et al. 2002 (2b, *corr.superfl.*)

lau02 The formal name correction, as suggested by Rivas-Martínez et al. (2002a: 241) based on the recognition of the Madeiran, Canarian and Moroccan populations as *L. novocanariensis* (Rivas-Martínez et al. 2002a), is premature and therefore not accepted here. The recent molecular studies (Arroyo-García et al. 2001; Rodríguez-Sánchez et al. 2009) do not support the current delimitation of species within the genus *Laurus*. Both papers have demonstrated, for instance, that the Western Mediterranean and particularly Iberian laurel populations (considered as '*L. nobilis*') are more closely related to Macaronesian '*L. azorica*' than to other '*L. nobilis*' populations from the Eastern Mediterranean. Because *L. nobilis* appeared paraphyletic to *L. azorica*, the status of which remained equivocal, we also refrain from further nomenclatural corrections until the latter issue is satisfactorily resolved. The mutation of the name to *Pruno-Lauretea azoricae* is a matter of preference for taxonomic rank since the current taxonomic concepts (see www.emplantbase.org) accept *Prunus lusitanica* subsp. *hixa* (Willd.) Franco as a valid subspecies concept. (LM)

LAU-01 *Andryalo pinnatifidae-Ericetalia arboreae* Oberd. 1965

Canarian seral matorral, retamal and erica groves in the laurisilva vegetation belt

- *Fayo-Ericetalia arboreae* Sunding 1972
- *Andryalo pinnatifidae-Ericetalia canariensis* Oberd. 1965 *corr*. Rivas-Mart. in Rivas-Mart. et al. 2011 *(corr.superfl.)*

lau03 The correction of the name as suggested by Rivas-Martínez et al. (2011: 403, 475, 772) and based on recognition of the Canary populations of *Erica arborea* as a new species *Erica canariensis* Rivas-Mart., Martín Osorio & Wildpret (Rivas-Martínez et al. 2011: 484), is premature. Although the authors of this new taxon claim to see morphological differences between *E. arborea* and *E. canariensis*,

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recent molecular and phylogeographic studies do not support the existence of a separate specific entity *E. arborea* in Macaronesia (Désamoré et al. 2011). (LM)

LAU-01A *Myrico fayae-Ericion arboreae* Oberd. 1965

Canarian seral ericoid matorral in the laurisilva vegetation belt

- *Fayo-Ericion arboreae* Oberd. 1965 (orig.form)
- *Myrico fayae-Ericion canariensis* Oberd. 1965 *corr*. Rivas-Mart. et al. 2011 (43)

lau04 See Remark *lau03*.

LAU-01B *Polysticho falcinelli-Ericion arboreae* Rivas-Mart. et al. 2002

Madeirean humid tall ericoid scrub on acidic soils in the laurisilva vegetation belt

- *Polysticho falcinelli-Ericion arboreae* Rivas-Mart. et al. 2001 (2b)
- *Polysticho falcinelli-Ericion canariensis* Rivas-Mart. et al. 2002 *corr*. Rivas-Mart. et al. in J.C. Costa et al. 2012 (43)

LAU-01C *Telino canariensis-Adenocarpion foliolosi* Rivas-Mart. et al. 1993

Canarian genistoid retamal in the pine forest and laurisilva vegetation belts

- *Adenocarpo foliolosi-Cytision proliferi* Rivas Goday et Esteve 1965 (2b)
- *Micromerio-Genistion* Oberd. 1965 (2b)
- *Adenocarpo foliolosi-Cytision proliferi* Esteve 1969
- *Micromerio-Cytision congesti* Esteve 1969
- *Cytision canariensis* Sunding 1972 (3f)
- *Micromerio-Telinion teneriffae sensu auct.* (phantom)

LAU-01D *Bystropogono punctati-Telinion maderensis* Capelo et al. 2000

Madeirean mid- and high-altitude retamoid scrub

LAU-01E *Euphorbion melliferae* Capelo et al. 2003

Macaronesian caulirosette scrub in forests clearings in the laurisilva vegetation belt

LAU-02 *Pruno-Lauretalia azoricae* Oberd. ex Rivas-Mart. et al. 1977

Macaronesian broad-leaved evergreen laurisilva forests

- *Ilici-Lauretalia* Rivas Goday 1960 (2b)
- *Pruno-Lauretalia azoricae* Oberd. 1965 (2b)
- *Lauro azoricae-Ilicetalia* Sjögren 1972 (3b)
- *Pruno hixae-Lauretalia novocanariensis* Oberd. ex Rivas-Mart. et al. 1977 *corr*. Rivas-Mart. et al. 2002 (43)

lau05 See Remark *lau02*.

LAU-02A *Ixantho viscosae-Laurion azoricae* Oberd. ex Santos in Rivas-Mart. et al. 1977

Canarian infra-thermomediterranean subhumid-humid hyperoceanic evergreen laurisilva forests

- *Laurion macaronesicum* Rübel 1930 (2b)
- *Laurion macaronesicum* Rübel ex Oberd. 1965 (2b)
- *Ixantho viscosae-Laurion novocanariensis* Oberd. ex Santos in Rivas-Mart. et al. 1977 *corr*. Rivas-Mart. et al. 2001 (5, *corr.superfl.*)
- *Ixantho viscosae-Laurion novocanariensis* Oberd. ex Santos in Rivas-Mart. et al. 1977 *corr*. Rivas-Mart. et al. 2002 (43)

lau06 See Remark *lau02*.

LAU-02B *Sibthorpio peregrinae-Clethrion arboreae* Capelo et al. 2000

Madeirean hyperoceanic subhumid-humid evergreen laurisilva forests

- *Clethro-Laurion* Sjögren 1972 (2b)

LAU-02C *Visneo mocanerae-Apollonion barbujanae* Rivas-Mart. in Capelo et al. 2000

Macaronesian subhumid mesophytic evergreen laurisilva forests

AZO *Lauro azoricae-Juniperetea brevifoliae* Rivas-Mart. et al. 2002

Azorean broad-leaved evergreen laurisilva forests and related mantle and heath

azo01 As in the case of the *Pruno lusitanicae-Lauretea azoricae*, the classification of both mature forests (*Frangulo azoricae-Lauretalia azoricae*) and the seral (successional) vegetation associated with these forests (*Ericetalia azoricae*) into one class is highly contentious and calls for a revision of old, untenable traditions. (LM)

- *Lauro azoricae-Juniperetea brevifoliae* Rivas-Mart. et al. 2001 (2b)

AZO-01 *Ericetalia azoricae* Lüpnitz 1975

Azorean ericoid mantle and seral heath of the humid evergreen laurisilva forests

AZO-01A *Juniperion brevifoliae* Sjögren 1973

Azorean ericoid mantle and seral heath of the humid evergreen laurisilva forests

- *Culcito macrocarpae-Juniperion brevifoliae* Lüpnitz 1975 (syntax.syn.)

AZO-02 *Frangulo azoricae-Lauretalia azoricae* Fernández Prieto, Dias et Aguiar in Fernández Prieto et al. 2012

Azorean evergreen laurisilva forests

- *Frangulo azoricae-Lauretalia azoricae* Aguiar, Fernández Prieto et Dias 2006 (2b)

AZO-02A *Dryopterido azoricae-Laurion azoricae* Rivas-Mart. et al. 2002

Azorean mid- and high-latitude humid evergreen laurisilva forests

- *Laurion macaronesicum* Lüpnitz 1976 (34a)
- *Dryopterido azoricae-Laurion azoricae* Rivas-Mart. et al. 2001 (2b)

AZO-02B *Myrico fayae-Pittosporion undulati* Lüpnitz 1976

Azorean low-altitude humid evergreen laurisilva forests

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- *Pittosporo undulati-Myricion fayae* Lüpnitz 1976 *nom. invers. propos.* (42)

CAN *Cytiso-Pinetea canariensis* Rivas Goday et Esteve ex Esteve 1969

Canarian pine forests and related juniper scrub

- *Cytiso-Pinetea canariensis* Rivas Goday et Esteve 1965 (2b)
- *Chamaecytiso proliferi-Pinetea canariensis* Rivas Goday et Esteve ex Esteve 1969 *nom. mut. propos.* (45)

can01 Martín Osorio et al. (2007) and Rivas-Martínez et al. (2002a: 281) published proposals serving this name change. Its value is, however, dubious since recent taxonomic studies (supported by molecular evidence; Käss & Wink 1997; Cubas et al. 2002) showed that the genus *Chamaecytisus* should be incorporated into *Cytisus*. (LM)

- *Cytiso-Pinetea canariensis* Rivas Goday et Esteve ex Sunding 1972 (31)

CAN-01 *Cytiso-Pinetalia canariensis* Rivas Goday et Esteve ex Esteve 1969

Canarian pine forests and related juniper scrub

- *Cytiso-Pinetalia canariensis* Rivas Goday et Esteve 1965 (2b)
- *Chamaecytiso-Pinetalia canariensis* Rivas Goday et Esteve ex Esteve 1969 *nom. mut. propos.* (45)

can02 See Remark *can01*.

- *Cytiso-Pinetalia canariensis* Rivas Goday et Esteve ex Sunding 1972 (31)

CAN-01A *Cisto symphytifolii-Pinion canariensis* Rivas Goday et Esteve ex Esteve 1969

Canarian pine forests

- *Cisto symphytifolii-Pinion canariensis* Rivas Goday et Esteve 1965 (2b)
- *Cisto symphytifolii-Pinion canariensis* Rivas Goday et Esteve ex Sunding 1972 (31)

CAN-01B *Juniperion cedri* Martín Osorio, Wildpret et Rivas-Mart. in Martín Osorio et al. 2007

Canarian pine-juniper scrub

- *Juniperion cedri* S. Brullo et De Marco in C. Brullo et al. 2008 (31)

SUP *Spartocytisetea supranubii* Schönfelder et Voggenreiter 1994

Canarian high-altitude volcanic semidesert scrub

sup01 According to several authors (Rivas-Martínez et al. 2002a, 2011; Brullo et al. 2008), this syntaxonomic concept should be considered a part of the Canarian pine forests of the *Cytiso-Pinetea*. However, this suggestion lacks both floristic as well as vegetation-structural logic. This unit is not a forest (unlike the *Cytiso-Pinetea*) and it is analogous to the Mediterranean retamal of the *Cytisetea scoparia-striati*. (LM)

- *Spartocytisetea nubigeni* Voggenreiter 1974 (2b, 3b)
- *Spartocytisetea nubigeni* Voggenreiter 1975 (2b)

SUP-01 *Spartocytisetalia supranubii* Schönfelder et Voggenreiter 1994

Canarian high-altitude volcanic semidesert scrub

- *Spartocytisetalia nubigeni* Voggenreiter 1975 (2b)

SUP-01A *Spartocytision nubigeni* Oberd. ex Esteve 1973

- *Canarian high-altitude volcanic semidesert scrub*
- *Spartocytision supranubii* Oberd. 1965 (3b)
- *Spartocytision nubigeni* Esteve 1969 (3b)
- *Spartocytision supranubii* Oberd. ex Esteve 1973 *nom. mut. propos.* (*mut.superfl.*)

sup02 Martín Osorio et al. (2007) and Rivas-Martínez et al. (2002a: 281) published proposals serving this name change. This mutation appears as superfluous since the latest molecular-phylogenetic studies (Cubas et al. 2002) established that the genus *Spartinocytisus* should be included within the *Cytisus*. (LM)

- *Spartocytision teydeanum* Voggenreiter 1975 (2b)
- *Echio wildpretii-Spartocytision* Voggenreiter 1975 (2b)

SUP-01B *Plantaginion webbii* Martín Osorio, Wildpret et Rivas-Mart. in Martín Osorio et al. 2007

Canarian low scrub on eroding volcanic tallus, seral to retamal and pinar

INTRAZONAL CLASSES OF THE CANARY ISLANDS, MADEIRA AND AZORES

MOQ *Polycarpaeo niveae-Traganetea moquini* Rivas-Mart. et Wildpret in Rivas-Mart. et al. 2002

Canarian, Cabo Verdan and Western Saharian halophilous coastal desertic dune scrub

- *Ammophiletea canariensis* Esteve 1968 (34a)
- *Zygophyllo fontanesii-Polycarpaeetea niveae* Santos 1983 (2b, 5)
- *Polycarpaeo niveae-Traganetea moquini* Rivas-Mart. et al. 2001 (2b)

MOQ-01 *Zygophyllo fontanesii-Polycarpaeetalia niveae* Santos ex Géhu et al. 1996

Canarian, Cabo Verdan and Western Saharian halophilous coastal desertic dune scrub

moq01 Géhu (1999) prefers to classify this order within the *Ammophiletea*. (LM)

- *Zygophyllo fontanesii-Polycarpaeetalia niveae* Santos 1983 (2b)
- *Ononidetalia ramosissimae* Galán de Mera et al. 1997 (syntax.syn.)

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MOQ-01A *Traganion moquinii* Sunding 1972
Canarian, Cabo Verdan and Western Saharian halophilous scrub on stabilized coastal desertic dunes
- *Zygophyllion fontanesii* Esteve 1968 (3b)
- *Zygophyllion fontanesii* Esteve ex Santos 1983 (syntax. syn.)
- *Ononido ramosissimae-Polycarpion niveae* Biondi et al. 1994 (syntax.syn.)
- *Zygophyllion fontanesii* Deil 1999 (2b, 3b)

MOQ-01B *Polycarpaeo niveae-Euphorbion paraliae* Rivas-Mart. et Wildpret in Rivas-Mart. et al. 2002
Canarian and Western Saharian halophilous scrub on mobile coastal desertic dunes
- *Polycarpaeo niveae-Euphorbion paraliae* Rivas-Mart. et al. 2001 (2b, 5)

MOQ-01C *Euphobio paraliae-Lotion glauci* Jardim et al. 2003
Dwarf scrub on stabilized coastal hind dunes of Madeira and Porto Santo

AEO *Aeonio-Greenovietea* Santos 1976
Macaronesian-Madeirean chomophytic and chasmophytic succulent-rich vegetation on volcanic rocky substrates and walls
- *Greenovio-Aeonietea* Santos 1976 *nom. invers. propos.* (42)

aeo01 The usefulness of this name inversion is highly questionable especially given that recent molecular-systematic studies confirmed congeneric relationship of the genera *Greenovia* and *Aeonium* (Mort et al. 2002). (LM)

AEO-01 *Soncho-Sempervivetalia* Rivas Goday et Esteve ex Sunding 1972
Macaronesian-Madeirean chomophytic and chasmophytic succulent-rich vegetation of exposed volcanic rock substrates and walls
- *Soncho-Sempervivetalia* Rivas Goday et Esteve 1965
- *Soncho acaulis-Aeonietalia* Rivas Goday et Esteve ex Sunding 1972 *nom. mut. propos.* (45)

aeo02 Rivas-Martínez et al. (2002a: 281) published the formal proposal serving this name change. (LM)
- *Greenovietalia* Santos 1983

AEO-01A *Soncho acaulis-Sempervivion* Sunding 1972
Canarian infra-thermomediterranean arid chomophytic and chasmophytic succulent-rich scrub on volcanic rock substrates
- *Soncho acaulis-Aeonion* Sunding 1972 *nom. mut. propos.* (45)

aeo03 Rivas-Martínez et al. (2002a: 281) published the formal proposal serving this name change. (LM)

AEO-01B *Greenovion aureae* Rivas-Mart. et al. 1993
Western Canarian upper thermo- to supramediterranean chomophytic and chasmophytic succulent-rich scrub on volcanic rock substrates
- *Greenovio-Festucion agustini* Santos 1983 (2b)

AEO-01C *Sinapidendro angustifolii-Aeonion glutinosi* Capelo et al. 2000
Madeirean chomophytic and chasmophytic succulent-rich scrub on volcanic rock substrates and walls

AEO-02 *Aichryso laxi-Monanthetalia laxiflorae* Santos et Reyes Betancort 2009
Canarian chomophytic herbaceous succulent-rich vegetation on shallow skeletal soils over partly shaded rocky habitats and walls

AEO-02A *Aichryso laxi-Monanthion laxiflorae* Santos et Reyes Betancort 2009
Canarian chomophytic herbaceous succulent-rich vegetation on shallow skeletal soils over partly shaded rocky habitats and walls

VIO *Violetea cheiranthifoliae* Voggenreiter ex Mucina *class. nov. hoc loco*
Canarian volcanic summit sparse herbland vegetation on pumic tallus screes

vio01 These are open low-scrub and herb-rich open communities of the scree-like habitats of young lava flows at high altitudes of Pico de Teide (Teneriffe, Canary Islands) and structurally analogous to some puna vegetation types of the Andes. It is not a retamal (or any other scrub of the kind) and therefore, both ecologically and structurally this vegetation type should not be included in the *Spartocytisetea supranubii*. According to several authors (Rivas-Martínez et al. 2002a, 2011; Brullo et al. 2008) this vegetation should be classified as a part of the Canarian broom scrub of the *Spartocytisetea supranubii* or of the Canarian pine forests of the *Cytiso-Pinetea*. Both suggestions however lack both floristic as well as vegetation-structural logic. Herewith I validate the Voggenreiter's (1974: 165) invalid name and designate the *Violetalia cheiranthifoliae* Voggenreiter ex Mucina in Mucina et al. 2016 (see below) as the *holotypus (hoc loco)* of the *Violetea cheiranthifoliae*. The character species of this class are identical to those listed for the *Violion cheiranthifoliae* and *Violetalia cheiranthifoliae* (see below). This vegetation is neither forest (unlike the *Cytiso-Pinetea*), not retamal (unlike *Spartinocytisetea supranubii*). (LM) ASG does not support an independent class status of the *Violetea cheiranthifoliae*.
- *Violetea cheiranthifoliae* Voggenreiter 1974 (2b, 3b)

VIO-01 *Violetalia cheiranthifoliae* Hohenester et Welβ ex Mucina *ordo nov. hoc loco*
Canarian volcanic summit sparse herbland vegetation on pumic tallus screes

vio02 The order *Violetalia cheiranthifoliae* was mentioned by Hohenester & Welβ (1993), who classified '*Violion*

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cheiranthifoliae' in this order. The *Violion cheiranthifoliae* was described invalidly because the only association classified within the latter alliance ('*Violetum cheiranthifoliae* Ceb. et Ort. 51') is an invalid name; there is no direct or indirect reference to 'Ceb. et Ort. 51' (obviously Ceballos and Ortuño 1951) in Hohenester & Welβ (1993). Herewith I designate the *Violion cheiranthifoliae* Voggenreiter ex Martín Osorio, Wildpret et Rivas-Mart. in Martín Osorio et al. 2007 (Phytocoenologia 37: 683), as the *holotypus (hoc loco)* of the *Violetalia cheiranthifoliae*. *Viola cheiranthifolia, Echium auberianum, Silene nocteolens, Stemmacantha cynaroides* and *Erigeron cabrerae* (see Brullo et al. 2008) are the character species of the *Violion cheiranthifoliae* and *Violetalia cheiranthifoliae*. (LM)

- *Violetalia cheiranthifoliae* Voggenreiter 1975 (phantom)
- *Violetalia cheiranthifoliae* Hohenester et Welβ 1993 (2b, 8)

VIO-01A *Violion cheiranthifoliae* Voggenreiter ex Martín Osorio, Wildpret et Rivas-Mart. in Martín Osorio et al. 2007

Canarian volcanic summit sparse herbland vegetation on pumic tallus screes

- *Violion cheiranthifoliae* Voggenreiter 1975 (2b)
- *Violion cheiranthifoliae* S. Brullo et De Marco in C. Brullo et al. 2008 (31)
- *Violion cheiranthifoliae* Voggenreiter ex Rivas-Mart., Martín Osorio et Wildpret in Rivas-Mart. et al. 2011 (31)

TOL *Tolpido azoricae-Holcetea rigidi* Fernández Prieto et Aguiar in Fernández Prieto et al. 2012

Azorean seral non-grazed perennial grasslands on rocky denuded soils

- *Tolpido azoricae-Holcetea rigidi* Aguiar, Fernández Prieto et Dias 2006 (2b)
- *Tolpido azoricae-Holcetea rigidi* Fernández Prieto 2012 (2b)

TOL-01 *Tolpido azoricae-Holcetalia rigidi* Fernández Prieto et Aguiar in Fernández Prieto et al. 2012

Azorean seral non-grazed perennial grasslands on rocky denuded soils

TOL-01A *Festucion francoi* Lüpnitz 1976 *corr.* Fernández Prieto, Aguiar, J.C. Costa, Lousã et Rivas-Mart. in Fernández Prieto et al. 2012

Azorean mid- to high-altitude seral non-grazed perennial grasslands on rocky denuded soils

tol01 It appears from the recent taxonomical literature that the name *Festuca jubata* Lowe is a misapplied name for the taxon occurring in the Azores. Fernández Prieto et al. (2008) showed that *F. jubata* is an endemic to Madeira and classified the Azorean plants as *F. francoi*. Hence *Festuca jubata sensu* Lüpnitz 1976 *et auct., non* Lowe should be called *Festuca francoi* Fernández Prieto, C. Aguiar, E. Dias & M.I. Gut. Fernández Prieto et al. (2012) formally published the name correction. (JPT, LM)

- *Festucion jubatae* Lüpnitz 1976 (43)

TOL-01B *Tolpido succulentae-Agrostion congestiflorae* Aguiar et Fernández Prieto in Fernández Prieto et al. 2012

Azorean low-altitude seral non-grazed perennial grasslands on rocky denuded soils

- *Tolpido succulentae-Agrostion congestiflorae* Aguiar, Fernández Prieto et Dias 2006 (2b)

AZONAL VEGETATION

ALLUVIAL FORESTS AND SCRUB

POP *Alno glutinosae-Populetea albae* P. Fukarek et Fabijanić 1968

Riparian gallery forests of the Eurosiberian and Mediterranean regions

pop01 This class encompasses azonal alluvial forests of Europe, North Africa and the western regions of the Middle East. Formerly, most of the syntaxonomic content of this class was classified within the '*Querco-Fagetea*', especially by Western and Central European authors, disregarding the principle of zonality/azonality. The two orders classified within this class reflect biogeographic (hence macroclimatic and evolutionary) drivers. The *Alno-Fraxinetalia* unites the European temperate alluvial forests, the *Populetalia albae* the Mediterranean gallery forests. It is commendable that Rivas-Martínez et al. (2002b) recognized this ecological paradox and attempted to remedy the situation by coining a class comprising azonal woodlands/forest and scrub. (LM) We consider the scrub sufficiently different, both physiognomically and floristically, to be considered a class in its own right (*Salicetea purpureae*). (LM)

- *Populetea albae* Br.-Bl. 1962 (phantom)
- *Tamarici-Platanetea orientalis* I. Kárpáti et V. Kárpáti 1962 (phantom)
- *Alno-Populetea* P. Fukarek 1964 (2b)
- *Alno-Populetea* P. Fukarek et Fabijanić 1968 (2b)
- *Fraxino excelsioris-Quercetea roboris* Gillet 1986 (1)
- *Tamarici-Platanetea orientalis* Buzo 2000 (2b)
- *Salici purpureae-Populetea nigrae* (Rivas-Mart. et Cantó ex Rivas-Mart. et al. 1991) Rivas-Mart. et Canto in Rivas-Mart. et al. 2002 p.p. (29b)

pop02 This name is a *nomen superfluum* with respect to the *Salicetea purpureae* despite it was typified by the *Populetalia albi* (Rivas-Martínez et al. 2002b: 536). The concept of the *Salici purpureae-Populetea nigrae* (as presented in the original

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diagnosis Rivas-Martínez et al. 2002b) includes also the *Salicetalia purpureae* that is the type of the *Salicetea purpureae* – a syntaxonomic concept we prefer to consider a class in its own right. (LM)

- *Salici purpureae-Populetea albae* (Rivas-Mart. et Cantó in Rivas-Mart. et al. 2002) Belmonte López 2008 (29a)

POP-01 *Populetalia albae* Br.-Bl. ex Tchou 1949 *nom. conserv. propos.*

Mediterranean and submediterranean riparian gallery forests

pop03 The reasons for the name conservation will be presented elsewhere. (LM)

- *Populetalia albae* Br.-Bl. 1931 (2b)
- *Populetalia albae* Br.-Bl. et Tx. 1943 (2b)
- *Platanetalia orientalis* Knapp 1959 (2b)
- *Platanetalia orientalis* Knapp ex I. Kárpáti et V. Kárpáti 1961 (syntax.syn.)
- *Platanetalia orientalis* I. Kárpáti in P. Fukarek 1968 (2b)
- *Tamarici-Platanetalia* P. Fukarek 1968 (2b)
- *Rhododendro pontici-Prunetalia lusitanicae* Pérez Latorre et al. 1999 (syntax.syn.)
- *Rhododendretalia pontici* Pérez Latorre, Galán de Mera et Cabezudo in Cabezudo et Pérez Latorre 2001 (29a)
- *Rubio peregrinae-Ulmetalia minoris* Biondi, Casavecchia, Gasparri et Pesaresi in Biondi et al. 2015 (syntax.syn.)

WESTERN MEDITERRANEAN ALLIANCES

POP-01A *Populion albae* Br.-Bl. ex Tchou 1949

Riparian forests of the submediterranean regions of Southern France and the Iberian Peninsula

- *Populion albae* Br.-Bl. 1931 (2b)
- *Populion albae* de Bannes-Puygiron 1933 (2b)
- *Populion albae* Br.-Bl. et Tx. 1943 (2b)
- *Populion albae* Br.-Bl. ex Tchou 1948 (2b)
- *Fraxino-Quercion pyrenaicae* Rivas Goday 1964 (syntax. syn.)
- *Fraxino angustifoliae-Populion albae* P. Fukarek 1978 (2b, 3b)
- *Fraxino angustifoliae ssp. angustifoliae-Populion albae* Julve 1993 (orig.form) (2b)
- *Clematido cirrhosae-Populion albae* Bensettiti 1999 (syntax.syn.)
- *Saponario officinalis-Populion albae* (Br.-Bl. ex Tchou 1948) Bensettiti 1999 (29)

POP-01B *Ligustro vulgaris–Alnion glutinosae* Poldini, Sburlino et Venanzoni in Biondi et al. 2015

Riparian forests of the submediterranean regions of the Northern and Central Apennine Peninsula

- *Euonymo-Alnion* Poldini et al. 2014 (2b)

POP-01C *Osmundo-Alnion glutinosae* (Br.-Bl. et al. 1956) Dierschke et Rivas-Mart. in Rivas-Mart. 1975

Alder and willow riparian forests of the Western Mediterranean

- *Alnion lusitanicum* Br.-Bl. et al. 1956 (34a)
- *Caricion microcarpae* Gamisans 1975 (syntax.syn.)
- *Osmundo-Alnion* (Br.-Bl. et al. 1956) Dierschke et Rivas-Mart. in Rivas-Mart. 1975 (2b)
- *Caricion microcarpae* Gamisans 1977 (31)

POP-01D *Rhododendro pontici-Prunion lusitanicae* Pérez Latorre, Galán de Mera et Cabezudo in Pérez Latorre et al. 1999

Southern Iberian mediterranean riparian forests with relict laurisilva elements

- *Scrophulario laxiflorae-Rhododendrion pontici* Pérez Latorre, Galán de Mera et Cabezudo in Cabezudo et Pérez Latorre 2001 (29b)

EASTERN (SUB)MEDITERRANEAN ALLIANCES

POP-01E *Platanion orientalis* I. Kárpáti et V. Kárpáti 1961

Platanus riparian gallery forests of the Eastern Mediterranean

- *Platanion orientalis* I. Kárpáti 1962 (31)

POP-01F *Lauro nobilis-Fraxinion angustifoliae* I. Kárpáti et V. Kárpáti 1961

Riparian gallery forests with relict laurisilva elements of the eastern submediterranean regions of the Apennine and Balkan Peninsulas

- *Lauro nobilis-Fraxinion oxycarpae* I. Kárpáti et V. Kárpáti 1961 *nom. mut. propos.* (45)

pop04 The mutation of the name (as suggested by Brullo & Spampinato 1999: 137) is not warranted since the status the name-giving taxon concerned (*Fraxinus angustifolia* Vahl. or *F. oxycarpa* Willd.) is a matter of opinion. The current taxonomy recognizes *Fraxinus angustifolia* subsp. *oxycarpa* (Willd.) Franco & Rocha Afonso. (LM)

- *Lauro nobilis-Fraxinion angustifoliae* I. Kárpáti 1962 (31)
- *Fraxino angustifoliae-Populion* P. Fukarek et Fabijanić 1968 (2b)
- *Populion albae* P. Fukarek et Fabijanić 1968 (31)
- *Fraxinion angustifoliae* Pedrotti 1970 (3b)
- *Fraxinion angustifoliae* Pedrotti ex Biondi et Casavecchia in Biondi et al. 2010 (5)
- *Carici remotae-Fraxinion oxycarpae* Pedrotti ex Pedrotti, Biondi, Allegrezza et Casavecchia in Biondi et al. 2014 (syntax.syn.)
- *Lauro nobilis–Ulmion minoris* Biondi, Casavecchia, Gasparri et Pesaresi in Biondi et al. 2015 (syntax.syn.)

POP-02 *Alno-Fraxinetalia excelsioris* Passarge 1968

Floodplain riparian forests on nutrient-rich alluvial soils of temperate and boreal Europe

- *Alno-Fraxinetalia excelsioris* Passarge in Passarge et G. Hofmann 1968 (31)
- *Alno glutinosae-Fraxinetalia excelsioris* Passarge 1968 (Regionalordnung) (3d)
- *Alno glutinosae-Fraxinetalia excelsioris* Passarge in Passarge et G. Hofmann 1968 (Regionalordnung) (3d)

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- *Alno incanae-Fraxinetalia excelsioris* Passarge 1968 (Regionalordnung) (3d)
- *Alno-Quercetalia* P. Fukarek 1968 (2b)
- *Carici remotae-Fraxinetalia excelsioris* Passarge 1968 (Regionalordnung) (3d)
- *Carici remotae-Fraxinetalia excelsioris* Passarge in Passarge et G. Hofmann 1968 (Regionalordnung) (3d)
- *Querco-Fraxinetalia excelsae* Passarge 1968 (Regionalordnung) (3d)
- *Querco-Fraxinetalia excelsae* Passarge in Passarge et G. Hofmann 1968 (Regionalordnung) (3d)
- *Ulmo-Fraxinetalia excelsioris* Passarge 1968 (syntax.syn.)
- *Alno-Fraxinetalia excelsioris* Moor 1976 (31)
- *Alnetalia glutinoso-incanae* Lakušić et al. 1979 (2b, 5)
- *Fraxino excelsioris-Alnetalia glutinosae* Julve 1993 (2b)
- *Cardamino amarae-Alnetalia glutinosae* Clausnitzer in Dengler et al. 2004 (syntax.syn.)

POP-02A *Alnion incanae* Pawłowski et al. 1928

Alder-ash and oak riparian floodplain forests on nutrient-rich alluvial soils in the nemoral zone of Europe

pop05 This alliance, and perhaps also its superior order, would be better placed in the *Carpino-Fagetea*. In Southern Europe, there are considerable differences between zonal and riparian forests but this contrast becomes less obvious in Central and Northern Europe. The *Alnion incanae* forests are most similar to the *Tilio-Acerion* and the *Melico-Tilion platyphylli* forests that are classified within the *Carpino-Fagetea*. (MC, JPT) Rivas-Martínez et al. (2011: 342) pursued a mediterraneo-centric view and classified this alliance within the *Populetalia.* (LM)

- *Alnion incanae* Pawłowski 1928 (2b)
- *Fraxino-Carpinion* Tx. et Diemont 1936 (3b)
- *Alno-Padion* Knapp 1942 (1)
- *Alno-Ulmion* Br.-Bl. et Tx. 1943 p.p. (2b)
- *Alno-Ulmion* Br.-Bl. et Tx. ex Tchou 1948 (syntax.syn.)
- *Fraxino-Alnion* Oberd. 1953
- *Alno-Padion* Knapp ex Medwecka-Kornaś in W. Matuszkiewicz et Borowik 1957 (29c)
- *Cardamino-Fraxinion excelsioris* Passarge 1968 (syntax. syn.)
- *Cardamino-Fraxinion excelsioris* Passarge in Passarge et G. Hofmann 1968 (31)
- *Carici remotae-Fraxinion excelsioris* Passarge 1968 (2b)
- *Carici remotae-Fraxinion excelsioris* Passarge in Passarge et G. Hofmann 1968 (31)
- *Eu-Filipendulo-Fraxinion excelsioris* Passarge 1968 (Regionalverband) (3d)
- *Eu-Filipendulo-Fraxinion excelsioris* Passarge in Passarge et G. Hofmann 1968 (Regionalverband) (3d)
- *Filipendulo-Fraxinion excelsioris* Passarge 1968 (syntax.syn.)
- *Filipendulo-Fraxinion excelsioris* Passarge in Passarge et G. Hofmann 1968 (31)
- *Fraxinion excelsioris* Nègre 1972
- *Alno-Fraxinion* Ellenberg et Klötzli 1974 (29c, 31)
- *Fraxinion excelsioris* Moor 1976 (syntax.syn.)

pop06 In Moor's (1976) concept, this unit included both alder-ash forests and elm-ash forests but excluded pure alder forests. It is a *nomen superfluum* since its original diagnosis includes the type associations of the *Carici remotae-Fraxinion* Passarge 1968 and of the *Filipendulo-Fraxinion* Passarge 1968. (WW)

POP-02B *Hyperico androsaemi-Alnion glutinosae* (Amigo et al. 1987) Biurrun et al. 2016

Alder, ash and burch floodplain forests along streams of the Cantabrian region of the Iberian Peninsula

POP-02C *Fraxino-Quercion roboris* Passarge 1968

Elm-ash and oak riparian floodplain forests on nutrient-rich brown soils in the nemoral zone of Europe

pop07 The syntaxonomic content of this unit is well known under the suballiance name *Ulmenion* Oberd. 1953 and as such has been frequently considered as part of the *Alnion incanae*. (WW, LM)

- *Alno-Ulmion* Br.-Bl. et Tx. 1943 p.p. (2b)
- *Ulmion carpinifoliae* Doing 1963 (2b)
- *Fraxino-Ulmion* Ellenberg 1963 (3b)
- *Carici-Ulmion carpinifoliae* Passarge 1968 (Regionalverband) (3d)
- *Carpino-Ulmion* Passarge 1968 (syntax.syn.)
- *Carpino-Ulmion* Passarge in Passarge et G. Hofmann 1968 (31)
- *Carpino-Ulmion carpinifoliae* Passarge in Passarge et G. Hofmann 1968 (Regionalverband) (3d)
- *Circaeo-Ulmion carpinifoliae* Passarge 1968 (Regionalverband) (3d)
- *Carpino-Ulmion scabrae* Passarge 1968 (Regionalverband) (3d)
- *Carpino-Ulmion scabrae* Passarge in Passarge et G. Hofmann 1968 (Regionalverband) (3d)
- *Carpino-Ulmion carpinifoliae* Passarge 1968 (Regionalverband) (3d)
- *Eu-Filipendulo-Fraxinion excelsae* Passarge 1968 (Regionalverband) (3d)
- *Eu-Fraxino-Quercion roboris* Passarge 1968 (Regionalverband) (3d)
- *Eu-Fraxino-Quercion roboris* Passarge in Passarge et G. Hofmann 1968 (Regionalverband) (3d)
- *Eu-Milio-Fraxinion excelsioris* Passarge 1968 (Regionalverband) (3d)
- *Eu-Milio-Fraxinion excelsioris* Passarge in Passarge et G. Hofmann 1968 (Regionalverband) (3d)
- *Fraxino-Quercion roboris* Passarge 1968 (syntax.syn.)
- *Fraxino-Quercion roboris* Passarge in Passarge et G. Hofmann 1968 (31)
- *Milio-Fraxinion excelsioris* Passarge 1968 (syntax.syn.)

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- *Milio-Fraxinion excelsioris* Passarge in Passarge et G. Hofmann 1968 (31)
- *Ulmo-Quercion roboris* Passarge 1968 (Regionalverband) (3d)
- *Ulmo-Quercion roboris* Passarge in Passarge et G. Hofmann 1968 (Regionalverband) (3d)
- *Fraxino excelsioris-Quercion roboris* Rameau 1996 (1)
- *Fraxino excelsioris-Quercion roboris* Rameau in Bensettiti et al. 2001 (2b, 5)
- *Fraxino excelsioris-Quercion roboris* Rameau in Royer et al. 2006 (31)

POP-02D *Alno-Quercion roboris* Horvat 1950

Alder-oak riparian floodplain forests on nutrient-rich alluvial soils of the temperate regions of the Balkan Peninsula

- *Alno-Quercion roboris* Horvat 1937 (2b)
- *Alnion incanae* Horvat 1938 (2b)
- *Ulmion* Simon 1957 (phantom)
- *Alnion incanae* Lakušić et al. 1975 (phantom)
- *Alnion incanae* Lakušić et al. 1979 (2b, 5)

POP-02E *Poo angustifoliae-Ulmion laevis* Golub in Golub et Kuzmina 1997

Oak-elm riparian floodplain forests on nutrient-rich alluvial soils in the steppe zone of Southern Russia

PUR *Salicetea purpureae* Moor 1958

Willow and tamarisk scrub and low open forests of riparian habitats in the temperate to arctic zones of Europe

- *Rubo-Salicetea purpureae* (Moor 1958) Passarge in Passarge et G. Hofmann 1968 (29c)
- *Salici purpureae-Populetea nigrae* (Rivas-Mart. et Cantó ex Rivas-Mart. et al. 1991) Rivas-Mart. et Canto in Rivas-Mart. et al. 2002 p.p. (29b)

pur01 As rightly observed by Dengler et al. (2004), the assumption of Rivas-Martínez et al. (2002a): 193) that this class name should be illegitimate according to ICPN art. 29b is unfounded and the new class-name *Salici purpureae-Populetea nigrae* (Rivas-Martínez et al. 2002a) is to be considered a *nomen superfluum* (ICPN art. 29c). (JD, LM)

PUR-01 *Salicetalia purpureae* Moor 1958

Willow scrub and low open forests of riparian habitats in the temperate to arctic zones of Europe

- *Salicetalia albae* T. Müller et Görs 1958 (3b)
- *Ranunculo-Salicetalia albae* Passarge 1968 (syntax.syn.)
- *Rubo-Salicetalia purpureae* (Moor 1958) Passarge et G. Hofmann 1968 (29c)

CENTRAL AND EASTERN EUROPEAN GROUP OF ALLIANCES

PUR-01A *Salicion eleagno-daphnoidis* (Moor 1958) Grass 1993

Willow scrub on the gravelly stream banks in the submontane to subalpine belts of the Alps, the Pyrenees and the Carpathians

pur02 The choice of this alliance as the nomenclature type of the *Salicetalia purpureae* (as suggested by Rivas-Martínez et al. 2011: 465) is illegitimate. (LM)

- *Hippophaion* Rübel 1933 (orig.form) (2b)
- *Myricarion* Rübel 1933 (2b)
- *Salicion eleagni* Moor 1958 (31)
- *Salici elaeagni subsp. elaeagni-Hippophaeion rhamnoidis ssp. fluviatilis* de Foucault et Julve in Julve 1993 (orig.form) (2d, 3b)
- *Salici elaeagni ssp. elaeagni-Hippophaeion rhamnoidis ssp. fluviatilis* de Foucault et Julve 2001 (orig.form) (5, 8)

PUR-01B *Salicion albae* Soó 1951

Willow and poplar low open forests of lowland to submontane river alluvia in the nemoral zone of Europe and at high altitudes of the Mediterranean

- *Salicion albae* Soó 1930 (2b)

pur03 The typification of this name by choosing the *Salicetum albae* Issler 1926 is superfluous since the *Salicion albae* Soó 1930 was invalidly published. An alliance with the same syntaxonomic content (and same name), was published later by de Soó (1951). (LM)

- *Populion albae* Tx. 1931 (3f)
- *Populion albae* Szafer 1935 (2b)
- *Saliceto-Populion albae* Klika 1943 (orig.form) (phantom)
- *Saliceto-Populion albae* Klika in Klika et Hadač 1944 (orig.form) (2b)
- *Salicion albae* Tx. 1955 (31)
- *Salicion albae* T. Müller et Görs 1958 (31)
- *Salicion eleagni* T. Müller et Görs 1958 (phantom)
- *Salicion purpureae* Moor 1958 (phantom)
- *Irido-Salicion albae* Passarge et G. Hofmann 1968 (syntax.syn.)
- *Salici fragilis-Alnion* Passarge 1968 (phantom)
- *Salici fragilis-Alnion* Passarge et G. Hofmann 1968 (syntax.syn.)
- *Salicion purpureae* Ellenberg et Klötzli 1974 (syntax.syn.)

pur04 The *Salicion purpureae* (Ellenberg & Klötzli 1974: 706–707, 928) is validly described since the author assigned one (validly described but carrying an illegitimate name) association, the '*Salicetum albae*' (syn. of the *Salicetum albo-fragilis* (Moor 1958)) into the *Salicion purpureae*. The '*Salicetum albae*' is also presented in the format of an unusual synoptic table (see the fold-out Table C IV in Ellenberg & Klötzli l.c.) where symbols representing constancy-class ranks were used. (LM)

- *Salicion purpureae* Lakušić et al. 1975 (phantom)
- *Salicion purpureae* Lakušić et al. 1979 (2b, 5)
- *Rubo caesiae-Populion nigrae* Passarge 1985 (syntax.syn.)
- *Populion nigrae* Schnitzler 1988
- *Populion nigrae* Rameau in Rameau et al. 1993 (2b, 3b)

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- *Asparago officinalis-Salicion albae* Golub 2001 (syntax. syn.)

PUR-01C *Salicion triandrae* T. Müller et Görs 1958

Willow scrub on loamy-sandy sedimentary river banks in the lowland to submontane belts of the nemoral zone of Europe

- *Salicion albae* Tx. ex Moor 1958 (31)
- *Rubo-Salicion triandrae* (T. Müller et Görs 1958) Passarge et G. Hofmann 1968 (29c)
- *Bidenti frondosae-Salicion triandrae* Golub et Kuzmina 1996 (1)
- *Bidenti frondosae-Salicion triandrae* Golub in Golub et Kuzmina 2004 (syntax.syn.)

PUR-01D *Rubo caesii-Amorphion fruticosae* Shevchyk et V. Solomakha in Shevchyk et al. 1996

Riparian scrub on temporarily flooded gleyic soils of Central Ukraine

PUR-01E *Artemisio dniproicae-Salicion acutifoliae* Shevchyk et V. Solomakha in Shevchyk et al. 1996

Willow scrub on riverine dunes of Central Ukraine

- *Agrostio vinealis–Salicion acutifoliae* Bulokhov 2005 (1)
- *Agrostio vinealis–Salicion acutifoliae* Bulokhov in Bulokhov et Semenishchenkov 2015 (syntax.syn.)

SUBMEDITERRANEAN GROUP OF ALLIANCES

PUR-01F *Salicion salviifoliae* Rivas-Mart. et al. 1984

Western Iberian thermo- to supramediterranean riparian alluvial willow scrub on the alluvia of mineral-poor rivers

PUR-01G *Salicion discolori-neotrichae* Br.-Bl. et O. de Bolòs 1958 *corr.* Rivas-Mart. et al. 2002

Eastern Iberian thermo- to supramediterranean riparian alluvial willow scrub on the alluvia of mineral-poor rivers

pur05 For the formal correction see Rivas-Martínez et al. (2002a: 242–243). (LM)

- *Salicion triandro-neotrichae* Br.-Bl. et O. de Bolòs 1958 (orig.form)
- *Salicion triandro-fragilis* Br.-Bl. et O. de Bolòs 1958 *corr.* O. de Bolòs 1983 (30, *corr.illeg.*)

PUR-01H *Salicion cantabricae* Rivas-Mart., T.E. Díaz et Penas in Rivas-Mart. et al. 2011

Cantabrian submediterranean montane pioneer willow scrub on the alluvia of mineral-poor rivers

PUR-01I *Salicion pedicellatae* Rivas-Mart. et al. 1984

Southern Iberian, Maghrebinian and Calabro-Sicilian thermo- to supramediterranean riparian alluvial willow scrub on the alluvia of mineral-poor rivers

- *Salicion pedicellatae* Galán de Mera, Pérez Latorre et Cabezudo in Pérez Latorre et al. 1999 (31)
- *Salicion pedicellatae* (Ubaldi 2003) Poldini et al. 2011 (31)

PUR-01J *Salicion apennino-purpureae* Biondi et Allegrezza in Biondi et al. 2014

Apennine submediterranean submontane-montane pioneer willow scrub on gravel alluvial riverine terraces

PUR-02 *Tamaricetalia ramosissimae* Borza et Boşcaiu ex Dolţu et al. 1980

Tamarisk riverine scrub of the lowland rivers of the Balkan Peninsula and the Sarmatian region of Southern Ukraine and Russia

- *Tamaricetalia ramosissimae* Borza et Boşcaiu 1963 (phantom)
- *Tamaricetalia ramosissimae* Borza et Boşcaiu 1965 (2b)
- *Tamaricetalia* I. Kárpáti in P. Fukarek 1968 (2b)
- *Tamaricetalia ramosissimae* Borza et Boşcaiu ex Popescu et Sanda 1992 (31)

PUR-02A *Tamaricion parviflorae* I. Kárpáti et V. Kárpáti 1961

Tamarisk riverine scrub on coarse gravelly soils on lowland river banks of the western regions of the Balkan Peninsula

- *Tamaricion parviflorae* I. Kárpáti 1962 (31)
- *Tamaricion parviflorae* I. Kárpáti et V. Kárpáti 1962 (phantom)

PUR-02B *Artemisio scopariae-Tamaricion ramosissimae* Simon et Dihoru 1963

Tamarisk riverine scrub on coarse gravelly soils on lowland rivers banks of the eastern regions of the Balkan Peninsula and the Sarmatian region of Southern Ukraine and Russia

- *Tamaricion ramosissimae* Borza et Boşcaiu 1965 (2b)
- *Tamaricion ramosssimae* Borza et Boşcaiu ex Dolţu, Popescu et Sanda 1980 (syntax.syn.)
- *Tamarici-Salicion purpureae* de Foucault 1991 (syntax. syn.)
- *Galio humifusi-Tamaricion ramosissimae* Golub et Kuzmina in Kuzmina 1996 (1)
- *Elytrigio repentis-Tamaricion ramosissimae* Golub in Barmin 2001 (2e, 5)

pur06 From the purely nomenclatural point of view, this alliance was invalidly described for several reasons. Firstly, the '*Atriplici aucheri-Tamaricetum ramosissimae* Golub 1998' is given as the type of this alliance. However, the bibliographic reference is obviously erroneous as only Golub et al. (1998) was cited in the list of references by Barmin (2001). Secondly, and most importantly, the new "alliance" is described under the wrong name (ICPN art. 2e: rank indicated does not correspond to the form of the name), the 'Soyuz *Elytrigio repentis-Tamaricetum ramosissimae* Golub. *all. nova*'). The Russian word "soyuz" means "alliance", however the ending (*-etum*) is indicative of the association rank! Thirdly, from the syntaxonomic point of view, the nomenclatural type (*Calamagrostio-Tamaricetum ramosissimae*) of the earlier published alliance *Artemisio scopariae-Tamaricion ramosissimae* has been incorporated into the protologue of the 'Soyuz *Elytrigio repentis-Tamaricetum ramosissimae* Golub *all. nova*' (see Barmin 2001: Table 1, column 22), hence the Barmin's (2001) 'alliance' was synonymized with the *Artemisio scopariae-Tamaricion ramosissimae*. (LM)

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PUR-03 *Rubo bollei-Salicetalia canariensis* Rivas-Mart. in Capelo et al. 2000

Willow woodlands on silt-rich alluvia, recent landslides and in beds of irregular streams of Madeira and the Canary Islands

pur07 Iberian (both Spanish and Portuguese) as well as Canarian vegetation scientists traditionally classify the vegetation of this order within the *Pruno-Lauretea azoricae*. This approach, however, does not follow several principles adopted by this vegetation system, the principle of zonality (the *Rubo-Salicetalia canariensis* are obviously azonal), the ecological differences (*Rubo-Salicetalia* are riparian – under periodic although not necessarily regular influence of flood disturbance) and floristic criteria. Species composition of the *Rubo-Salicetalia* communities is very different from those of the other two orders within the *Pruno-Lauretea azoricae* and definitely poorer in endemics than the *Andryalo-Ericetalia* and/or *Pruno-Lauretalia azoricae*. (LM) This argument is challenged by JC and ASG who prefer the traditional classification option and classify the *Rubo bollei-Salicetalia canariensis* in the *Pruno lusitanicae-Lauretea azoricae*.

PUR-03A *Salicion canariensis* Rivas-Mart., Wildpret, Del Arco, O. Rodríguez, Pérez de Paz, García Gallo, Acebes, T.E. Díaz et Fernández-González ex Rivas-Mart. et al. 1999

Willow woodlands on silt-rich alluvia, recent landslides and in beds of irregular streams of Madeira and the Canary Islands

- *Salicion canariensis* Rivas-Mart. et al. 1993 (2b)

SWAMP FORESTS AND SCRUB

ALN *Alnetea glutinosae* Br.-Bl. et Tx. ex Westhoff et al. 1946

European mesotrophic regularly flooded alder carr and birch wooded mires

- *Alnetea glutinosae* Br.-Bl. et Tx. 1943 (2b)
- *Vaccinietea uliginosi* Lohmeyer et Tx. in Tx. 1955 p.p. (2b)
- *Carici-Alnetea glutinosae* Passarge 1968 (syntax.syn.)
- *Carici-Alnetea glutinosae* Passarge in Passarge et G. Hofmann 1968 (31)
- *Eriophoro-Betuletea pubescentis* Passarge 1978
- *Molinio-Betuletea pubescentis* Passarge in Passarge et G. Hofmann 1968 (31)
- *Eriophoro-Betuletea pubescentis* Passarge 1983
- *Uliginosi-Betulo-Pinetea* Scamoni 1985 p.p. (orig.form) (34)
- *Vaccinio-Betuletea pubescentis* Stortelder et al. 1999

ALN-01 *Alnetalia glutinosae* Tx. 1937

European mesotrophic regularly flooded alder carr

- *Populetalia albae* Tx. 1931 *nom. ambig. rejic. propos.* (3f, 36)

aln01 Tüxen (1931) published the order name (*Populetalia albae*) validly, unfortunately with the *Alnion glutinosae* as the type (see Dengler et al. 2004). Thus the *Populetalia albae* is a syntaxonomic synonym of the *Alnetalia glutinosae*. (JD)

- *Calamagrostio-Alnetalia glutinosae* Passarge 1968 (syntax. syn.)
- *Calamagrostio-Alnetalia glutinosae* Passarge in Passarge et G. Hofmann 1968 (31)
- *Irido-Alnetalia glutinosae* Passarge 1968 (syntax.syn.)
- *Irido-Alnetalia glutinosae* Passarge in Passarge et G. Hofmann 1968 (31)

ALN-01A *Alnion glutinosae* Malcuit 1929

European mesotrophic regularly flooded alder carr

aln02 The floristic and ecological variation in this alliance justifies recognition of more than one alliance. In Mecklenburg-Vorpommern alone, Clausnitzer (in Berg et al. 2001, 2004) recognized two orders and four alliances, distinguished floristically and ecologically. (JD)

- *Athyrio-Alnion glutinosae* Passarge 1968 (2b)
- *Athyrio-Alnion glutinosae* Passarge in Passarge et G. Hofmann 1968 (syntax.syn.)
- *Irido-Alnion glutinosae* Passarge 1968 (syntax.syn.)
- *Irido-Alnion glutinosae* Passarge in Passarge et G. Hofmann 1968 (31)

aln03 Berg et al. (2004) prefer to consider this unit as an alliance in its own right. (LM)

- *Sphagno-Alnion glutinosae* Passarge 1968 (syntax.syn.)
- *Sphagno-Alnion glutinosae* Passarge in Passarge et G. Hofmann 1968 (31)
- *Pellio-Alnion glutinosae* Passarge 1978 (2b)
- *Thylepterido-Alnion glutinosae* Passarge 1979 (2b)
- *Scirpo sylvatici-Alnion glutinosae* Kevey 2008 (syntax.syn.)

ALN-01B *Frangulo alni-Fraxinion oxycarpae* Poldini, Sburlino et Venanzoni in Biondi et al. 2015

Amphiadriatic mesotrophic interdune and karstic ash carr

- *Cladio-Fraxinion oxycarpae* Poldini et al. 2014 (2b)

ALN-02 *Salici pentandrae-Betuletalia pubescentis* Clausnitzer in Dengler et al. 2004

Eurasian basiphilous birch forests on mesotrophic mires

ALN-02A *Salici pentandrae-Betulion pubescentis* Clausnitzer in Dengler et al. 2004

Eurasian basiphilous birch forests on mesotrophic mires

- *Carici-Betulion pubescentis-verrucosae* Pałczyński 1975 (3b)
- *Pino-Betulion pubescentis* Sokołowski 1980 (phantom)
- *Salici-Betulion pubescentis* V. Ranđelović 1994 (1)
- *Rhamno catharticae-Betulion pubescentis* Clausnitzer in Dengler et al. 2004 (syntax.syn.)
- *Salici-Betulion pubescentis* V. Ranđelović in V. Ranđelović et Zlatković 2010 (2b, 8)

ALN-03 *Sphagno-Betuletalia pubescentis* Scamoni et Passarge 1959

Eurasian acidophilous birch forests on mesotrophic mires

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- *Vaccinietalia uliginosi* Lohmeyer et Tx. in Tx. 1955 p.p. (2b)
- *Eriophoro-Betuletalia pubescentis* Passarge 1968 (syntax. syn.)
- *Eriophoro-Betuletalia pubescentis* Passarge in Passarge et G. Hofmann 1968 (31)
- *Molinio-Betuletalia pubescentis* Passarge 1968 (syntax.syn.)
- *Molinio-Betuletalia pubescentis* Passarge in Passarge et G. Hofmann 1968 (31)
- *Vaccinio-Betuletalia pubescentis* Stortelder et al. 1999
- *Menyantho trifoliati-Betuletalia pubescentis* Grygora et al. 2005

ALN-03A *Betulion pubescentis* Lohmeyer et Tx. ex Oberd. 1957

Eurasian acidophilous wet birch forests on mesotrophic mires

- *Betulion pubescentis* Lohmeyer et Tx. in Tx. 1955 (2b)

aln04 This alliance was classified in the *Vaccinio uliginosi-Pinetalia* (*Vaccinio uliginosi-Pinetea sylvestris*) by Lawesson (2004). (LM)

- *Sphagno-Betulion pubescentis* Doing 1962 (2b)
- *Eriophoro-Betulion pubescentis* Passarge 1968 (syntax.syn.)
- *Eriophoro-Betulion pubescentis* Passarge in Passarge et G. Hofmann 1968 (31)
- *Pleurozio-Betulion pubescentis* Passarge 1968 (syntax.syn.)
- *Pleurozio-Betulion pubescentis* Passarge in Passarge et G. Hofmann 1968 (31)
- *Sphagno-Betulion pubescentis* Passarge 1968 (syntax.syn.)
- *Sphagno-Betulion pubescentis* Passarge in Passarge et G. Hofmann 1968 (31)
- *Oxycocco palustris-Betulion pubescentis* Grygora et al. 2005
- *Sorbo aucupariae-Betulion pubescentis* Boeuf et al. 2014 (3b)

FRA *Franguletea* Doing ex Westhoff in Westhoff et Den Held 1969

Willow carr of Western Europe, Fennoscandia and the subatlantic regions of Central Europe

fra01 Recognition of this class is based on the principles of zonality/azonality and separation of forest/wood and scrub communities into separate classes. The class has been accepted in vegetation surveys of the Netherlands (Schaminée et al. 1998b), Germany (Weber 1998) and Austria (Willner & Grabherr 2007). The syntaxonomic content of this class is sometimes incorporated in the *Rhamno-Prunetea* (e.g. Bardat et al. 2004; Rivas-Martínez et al. 2011: 332, etc.). (LM)

- *Franguletea* Doing 1962 (2b)
- *Salici-Franguletea* Jurko 1964 p.p. (2b)
- *Carici-Salicetea cinereae* Passarge in Passarge et G. Hofmann 1968 (syntax.syn.)
- *Franguletea* Westhoff in Westhoff et Den Held 1969 (31)
- *Franguletea* Westhoff in Heukels et Oostroom 1978 (31)

FRA-01 *Salicetalia auritae* Doing 1962

Willow carr of Western Europe, Fennoscandia and the subatlantic regions of Central Europe

- *Alno-Salicetalia cinereae* Doing 1962 (2b)
- *Calamagrostio-Salicetalia cinereae* Passarge 1968 (phantom)
- *Calamagrostio-Salicetalia cinereae* Passarge in Passarge et G. Hofmann 1968 (syntax.syn.)
- *Eriophoro-Salicetalia cinereae* Passarge in Passarge et G. Hofmann 1968 (3b)
- *Salicetalia auritae* Doing ex Krausch 1968 (31)
- *Salicetalia auritae* Doing ex Westhoff in Heukel et Oostroom 1968 (31)
- *Salicetalia auritae* Doing ex Westhoff in Westhoff et Den Held 1969
- *Urtico-Salicetalia cinereae* Passarge 1981 (syntax. syn.)

FRA-01A *Salicion cinereae* T. Müller et Görs ex Passarge 1961

Willow carr of Western Europe and the subatlantic regions of Central Europe

- *Salicion cinereae* T. Müller et Görs 1958 (2b)
- *Alno-Salicion cinereae* Doing 1962 (syntax.syn.)
- *Frangulo-Salicion auritae* Doing 1962 (phantom)
- *Salicion auritae* Doing 1962 (syntax.syn.)
- *Alno-Salicion auritae* Doing ex Passarge in Passarge et G. Hofmann 1968 (phantom)
- *Comaro-Salicion auritae* Passarge in Passarge et G. Hofmann 1968 (Regionalverband) (3d)
- *Comaro-Salicion cinereae* Passarge in Passarge et G. Hofmann 1968 (syntax.syn.)
- *Eriophoro-Salicion auritae* Passarge in Passarge et G. Hofmann 1968 (Regionalverband) (3d)
- *Eriophoro-Salicion cinereae* Passarge in Passarge 1968 (phantom)
- *Eriophoro-Salicion cinereae* Passarge in Passarge et G. Hofmann 1968 (syntax.syn.)
- *Frangulo-Salicion auritae* Doing ex Steffen 1968
- *Urtico-Salicion cinereae* Passarge 1968 (phantom)
- *Urtico-Salicion cinereae* Passarge in Passarge et G. Hofmann 1968 (syntax.syn.)
- *Betulo-Salicion repentis* Succow 1974
- *Sphagno-Salicion auritae* (Doing 1962) Succow 1974 (29)
- *Equiseto-Salicion cinereae* Passarge 1978 (2b, 3b)
- *Peucedano-Salicion cinereae* Passarge 1978 (2b)
- *Equiseto-Salicion cinereae* Passarge 1981 (syntax.syn.)
- *Impatienti-Salicion uliginosae* Passarge 1981 (3b)
- *Salici cinereae-Viburnion opuli* Passarge ex de Foucault 1991 (phantom)
- *Salici cinereae-Viburnion opuli* Passarge ex de Foucault 1992 (syntax.syn.)

fra02 The classification of this unit remains contentious. According to de Foucault (1992) these communities are

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composed of elements of the *Salicetea purpureae* and the *Rhamno-Prunetea*. The nomenclature type of the alliance is the *Salici-Viburnetum opuli* Moor 1958. Following Passarge (1985), the *Salici-Viburnenion* Passarge 1985 (suballiance) belongs to the *Urtico-Crataegetalia*, while according to Bardat et al. (2004) it should be classified within the *Prunetalia spinosae*. (JPT)

- *Osmundo regalis-Myricion gale* de Foucault ex Julve 1993 (5)
- *Ribeso nigri-Salicion cinereae* de Foucault ex Julve 1993 (syntax.syn.)
- *Salici cinereae-Rhamnion catharticae* Géhu, de Foucault et Delelis ex Rameau in Bensettiti et al. 2001 (2b)
- *Salici cinereae-Rhamnion catharticae* Géhu, de Foucault et Delelis ex Rameau in Bardat et al. 2004 (3b)
- *Molinio-Alnion glutinosae* Kevey 2008 (5)
- *Osmundo regalis-Myricion gale* Julve ex de Foucault et Royer 2014 (syntax.syn.)

FRA-01B *Alno incanae-Salicion pentandrae* Kielland-Lund 1981

Alder-willow carr in the boreal zone of Fennoscandia and Northern Russia

VEGETATION OF COASTAL CLIFFS AND DUNES

SAG *Saginetea maritimae* Westhoff et al. 1962

Atlantic-Mediterranean and Macaronesian ephemeral winter-annual vegetation in disturbed saline habitats and inland saline badlands

sag01 The communities of this class typically occupy small disturbed sites within large stands of the *Juncetea maritimi* Br.-Bl. in Br.-Bl. et al. 1952, often characterized by some sand deposition. These transitional habitats connect the *Juncetea maritimi* and the *Koelerio-Corynephoretea* and support specific taxa that prompted some authors to establish a separate class for this ecotone. However, some other authors have highlighted that in the *Saginetea maritimae* the character species of the *Juncetea maritimi* prevail and thus, the *Saginetea maritimae* should be included in the latter class. For example, Dierßen & Dierßen (1996) suggested subordinating all Nordic syntaxa of the *Saginetea maritimae* into the *Armerion maritimae* (*Juncetea maritimi*). Also, Polte (2001, 2004) found that the *Saginetalia maritimae* shows such little floristic distinction towards other salt marsh communities that they do not deserve a status of class in their own right, but rather should be included into the *Juncetea maritimi* (best placed there as an alliance within the *Juncetalia maritimi*). An *ad hoc* implementation of this alternative view would suggest placing the orders *Saginetalia maritimae* and *Frankenietalia pulverulentae* in the *Juncetea maritimi*. (JD) KD also suggests that because the character species of the class show regionally different frequency, the distinction of this class from the *Juncetea maritimi* is weak. The opinions expressed above focus on floristic co-occurrence that might be a result of sampling scale; they also neglect the unique ecological nature of the *Saginetea maritimae*. The communities of this class occur in ecotonal situations spanning two different contrasting macrohabitats of the coastal dunes and coastal salt marshes, linked by steep dry-wet and fresh-saline gradients. The communities of the *Isoëto-Nanojuncetea* can be seen as a 'freshwater' analogue. The dynamic ecology (ecological filters or selective pressures) of these transitional habitats selects for a unique set of flora characterized by increased occurrence of short-lived herbs. It is not surprising that the relevés of the *Saginetea maritimae* communities have high number of the *Juncetea maritimi* species. Firstly, the stands of both communities are (as a rule) sampled using different plot sizes (large for the *Juncetea maritimi*, small for the *Saginetea maritimae*), hence the *Saginetea maritimae* species are often 'captured' as belonging to the *Juncetea maritimi*; and secondly, because of their spatial juxtaposition, admixture of phytocoenologic elements in both directions is a frequent phenomenon. (LM, JS)

- *Mesembryanthemetea nodiflori* Nègre 1959 (2b)
- *Saginetea maritimae* Westhoff et al. 1961 (phantom)
- *Saginetea maritimae* Westhoff et al. in Beeftink 1962 (31)
- *Centaurietea* Freijsen 1967 (phantom)
- *Frankenietea pulverulentae* Rivas-Mart. in Rivas-Mart. et M. Costa 1976 (2b)
- *Frankenietea pulverulentae* Rivas-Mart. ex Castroviejo et Porta 1976 (syntax.syn.)

SAG-01 *Saginetalia maritimae* Westhoff et al. 1962

Atlantic-Mediterranean ephemeral vegetation on aerohaline sandy soils of disturbed salt-marsh fringes

- *Saginetalia maritimae* Westhoff et al. 1961 (phantom)
- *Centaurietalia vulgaris* Freijsen 1967 (phantom)
- *Spergularietalia macrorhizae* Gamisans et Paradis 1992 (2b)
- *Spergularietalia macrorhizae* Gamisans 1993 (2b)

ATLANTIC-WESTERN MEDITERRANEAN GROUP OF ALLIANCES

SAG-01A *Saginion maritimae* Westhoff et al. 1962

Atlantic and Western Mediterranean short-lived aerohaline vegetation of sandy flats of disturbed salt-marshes

- *Saginion maritimae* Westhoff et al. 1961 (phantom)
- *Centaurion vulgaris* Freijsen 1967 (phantom)

SAG-01B *Spergularion macrorhizae* Gamisans 1990

Cyrno-Sardean short-lived aerohaline vegetation of sandy flats of disturbed salt-marshes

- *Catapodion marini* Paradis et al. 1999 (syntax.syn.)

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CENTRAL-EASTERN MEDITERRANEAN GROUP OF ALLIANCES

SAG-01C *Junco ranarii-Plantaginion commutatae* Horvatić 1934

Adriatic short-lived aerohaline vegetation of sandy flats of disturbed salt-marshes

- *Pholiuro-Spergularion* Pignatti 1952 (syntax.syn.)
- *Puccinellion distantis sensu* Pignatti 1953, *non* Klika et Vlach 1937 (pseudonym)

sag02 Although Pignatti (1953: 10) cited '*Puccinellion distantis* Soó 1933' and '*Puccinellion distantis* Klika and Vlach 1937' in the synonymy of his '*Puccinellion distantis* (Soó 1933) Pignatti 1953', the latter unit has ecologically and otherwise very little in common with either the '*Puccinellion limosae* Soó 1933' or '*Puccinellion distantis* Klika and Vlach 1937' and therefore we should view the *Puccinellion distantis* (Soó 1933) Pignatti 1953 as a misapplied concept (pseudonym). (LM)

SAG-01D *Romuleo-Saginion* (Wolff 1968) Mucina *nom. nov. hoc loco*

Northern Aegean short-lived aerohaline vegetation of sandy flats of disturbed salt-marshes

sag03 Wolff (1968) described the '*Saginion mediterraneum'* and assigned one validly described association (the *Romuleo-Saginetum maritimae* Wolff 1968) into this alliance. The latter association automatically becomes the *holotypus* of the alliance. As the character species of the alliance Wolff (l.c.) listed *Bellis annua* and *Polypogon maritimum*. This syntaxon represents an ecologically and geographically well-defined vegetation unit of the *Saginetea maritima*e in the Eastern Mediterranean. Here I introduce a *nomen novum* for this alliance, rectifying its illegitimate status (IPCN art. 34a). (LM)

- *Saginion mediterraneum* Wolff 1968 (34a)

SAG-01E *Sileno sedoidis-Catapodion loliacei* de Foucault et Bioret 2010

Southern Aegean and Cypriotic short-lived aerohaline vegetation of sandy flats of disturbed salt-marshes

sag04 This alliance concept is acceptable under the provision of the exclusion of the units listed under columns 27 through 29 in Table 1 of de Foucault & Bioret (2010) that represent communities of the Western Mediterranean provenience. (LM)

SAG-02 *Frankenietalia pulverulentae* Rivas-Mart. ex Castroviejo et Porta 1976

Ephemeral vegetation on clayey and silty saline soils of the Mediterranean and Macaronesia

- *Mesembryanthemetalia nodiflori* Nègre 1959 (2b)
- *Frankenietalia pulverulentae* Rivas-Mart. in Rivas-Mart. et M. Costa 1976 (2b)

SAG-02A *Frankenion pulverulentae* Rivas-Mart. ex Castroviejo et Porta 1976

Ephemeral vegetation on clayey saline soils of the Western Mediterranean

- *Frankenion pulverulentae* Rivas-Mart. in Rivas-Mart. et M. Costa 1976 (2b)
- *Hordeion marini* Ladero et al. 1984 (syntax.syn.)

SAG-02B *Polypogonion subspathacei* Gamisans 1990

Ephemeral vegetation on clayey saline soils of Corsica and Sardinia

- *Polypogonion subspathacei* Gamisans in Gamisans et Paradis 1992 (31)

SAG-02C *Gaudinio-Podospermion cani* S. Brullo et Siracusa 2000

Ephemeral vegetation on clayey saline soils of the Siculo-Calabrian badlands

SAG-02D *Pholiuro-Spergularion* Pignatti 1952

Ephemeral aerohaline vegetation on fine-grained soils of the Central and Eastern Mediterranean seaboards

- *Limonion avei* Barbagallo et al. 1984 (2b)
- *Limonion avei* S. Brullo 1988 (syntax.syn.)
- *Limonion echioidis* S. Brullo 1988 *corr*. Bergmeier in Bergmeier et Dimopoulos 2003 (43)

SAG-02E *Mesembryanthemion nodiflori* Nègre 1959

Ephemeral halo-nitrophilous aerohaline succulent therophytic vegetation on sandy and silty soils of the Eastern Mediterranean

- *Mesembryanthemion nodiflori* Géhu et al. 1990 (phantom)
- *Mesembryanthemion nodiflori* Géhu et al. 1991 (31)

SAG-02F *Mesembryanthemion crystallini* Rivas-Mart. et al. 1993

Ephemeral Western Mediterranean and Macaronesian subhalophilous alien succulent therophytic vegetation

CRI *Crithmo-Staticetea* Br.-Bl. in Br.-Bl. et al. 1952

Rupicolous vegetation of salt-sprayed coastal cliffs of the Atlantic and Mediterranean seaboards of Europe, North Africa and Middle East

cri01 The concept of the *Crithmo-Staticetea* as presented in this survey contains four orders, of which the *Crithmo-Staticetalia* encompasses communities of strongly halophilous, species-poor herbaceous vegetation of rocky cliffs at the sea-land interface (both along the Atlantic and Mediterranean seashores). Two other orders characterize coastal vegetation on hard rocky substrates under sea-borne salt influence, occupying ecotonal habitats on the inland border of the salt-spray zone, hence mediating between the *Crithmo-Staticetalia* and coastal tomillar/phrygana and low-grown garrigue of the *Rosmarinetea,* the *Cisto-Lavanduletea* (less frequently) and the *Cisto-Micromerietea*. The ecotonal communities of this type are species-rich and contain elements of both neighbouring vegetation types as well as a suite of endemics ecologically limited to this vegetation.

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The *Crithmo-Armerietalia* was described to accommodate the communities of the Atlantic seaboards, while the *Helichrysetalia italici* encompasses the Mediterranean group of communities. The last order, the *Frankenio-Astydametalia,* is an endemic unit of the Macaronesian archipelago. (LM)

- *Crithmo-Staticetea* Br.-Bl. in Br.-Bl. et al. 1947 (2b)
- *Crithmo-Limonietea* Br.-Bl. in Br.-Bl. et al. 1952 *nom. mut. propos.* (45)

cri02 The *nomina mutata proposita* for the *Crithmo-Staticetea, Crithmo-Staticetalia* and *Crithmo-Staticion* is motivated by the fact that the name *Limonium* is a *nomen conservandum* according to the International Code of Plant Nomenclature and that the name *Statice* is no longer in use. Two formal proposals serving this name change to *Crithmo-Limonietea* was put forward by Mayer (1995: 101) and Rivas-Martínez et al. (2002a: 256). (LM)

- *Crithmo-Limonietea pseudominuti* Br.-Bl. et al. 1947 *corr.* Julve 1993 (2b, *corr.superfl.*)
- *Astydamio-Limonietea* Voggenreiter 1995 (2b, 5, 8)
- *Armerio maritimae-Festucetea pruinosae* Bioret et Géhu 2008 (syntax.syn.)

CRI-01 *Crithmo-Staticetalia* Molinier 1934

Rupicolous vegetation of salt-sprayed cliffs of the Atlantic and Mediterranean coasts of Europe, North Africa and Middle East

- *Crithmo-Limonietalia* Molinier 1934 *nom. mut. propos.* (45)

cri03 Rivas-Martínez et al. (2002a: 256) formally suggested this name change. See also the Remark *cri02*. (LM)

- *Staticetalia* Chapman 1959 p.p. (2b)
- *Astragaletalia glacialis* Lovrić 1971 (2b)
- *Crithmo-Limonietalia pseudominuti* Molinier 1934 *corr.* Julve 1993 (40a, *corr.illeg.*)

ATLANTIC ALLIANCE

CRI-01A *Crithmion maritimi* Tx. et Oberd. 1958

Rupicolous vegetation of salt-sprayed rocky cliffs of the Atlantic coasts of Western Europe

- *Crithmion maritimi* Pavillard 1928 (2b)
- *Crithmo-Limonion binervosi* (Géhu et Géhu-Franck 1984) Géhu 1997

WESTERN MEDITERRANEAN GROUP OF ALLIANCES

CRI-01B *Crithmo-Staticion* Molinier 1934

Rupicolous dwarf-herb vegetation of salt-sprayed limestone cliffs of the Tyrrhenian and Ligurian coasts

- *Crithmo-Limonion* Molinier 1934 *nom. mut. propos.* (45)

cri04 Rivas-Martinez et al. (2002a: 256) formally suggested this name change. See also the Remark *cri03*. (LM)

- *Crithmo-Limonion articulati* Molinier 1934 (40a)

cri05 A number of authors (e.g. Julve 1993; see also Géhu & Franck 1984) have "amended" the name by recognizing several *Limonium* taxa (*L. articulatum, L. minutum, L. pseudominutum*) as the eponymous ones. However, the original diagnosis (Molinier 1934) is not conclusive in this matter and therefore any correction of the original name does not appear admissible. (LM)

- *Crithmo-Limonion minuti* Molinier 1934 (40a)
- *Crithmo-Limonion pseudominuti* Molinier 1934 (*sensu* Julve 1993) (40a)
- *Erodio corsici-Limonion articulati* (Gamisans et Muracciole 1984) Géhu et Biondi 1994 (syntax.syn.)
- *Erodion corsici* Géhu et Biondi in Géhu 1994 (5)

cri06 Géhu (1994; the symposium was held in 1993, but the proceedings were effectively published in 1994) introduced the '*Erodion corsici* (Gamisans et Muracciole 1985) *stat. nov.* Géhu et Biondi 1994'. There is, however, no publication co-authored by Gamisans and Muracciole in 1985, yet there exists the *Erodenion corsici* (suballiance) described by Gamisans & Muracciole (1985) that most probably served Géhu (1994) as the basis for the description of the *Erodion corsic*i (by up-ranking the suballiance onto the alliance level). The latter publication was, however, not listed in the References ('Orientation bibliographique' on p. 211) of Géhu's (1994) paper. The up-ranking of the suballiance into the alliance level was published by Géhu & Biondi (1994). (LM)

CRI-01C *Crithmo-Daucion halophili* Rivas-Mart. et al. 1990

Rupicolous dwarf-herb vegetation of salt-sprayed cliffs of the southwestern Iberian Peninsula and Northern Morocco

CENTRAL AND EASTERN MEDITERRANEAN GROUP OF ALLIANCES

CRI-01D *Limonion anfracti-cancellati* (Horvatić 1934) Mucina *nom. nov. hoc loco*

Rupicolous herb-rich vegetation of salt-sprayed rocky cliffs of the Adriatic coasts

cri07 The introduction of the *nomen novum* is inevitable since the name *Staticion dalmaticum* Horvatić 1934 carries a geographic epithet; there is no '*Statice dalmatica*' listed in the protologue of the latter alliance (see Horvatić 1934). Here we designate the *Plantagini-Staticetum cancellati* Horvatić 1934 as the *lectotypus (hoc loco)* of the *Limonion anfracti-cancellati*. The diagnostic (character) species of the alliance are: *Limonium anfractum, L. cancellatum, L. diomedeum, L. dubium, L. vestitum* and *Goniolimon dalmaticum*. Trinajstić (2008: 17–18) classified the contents of this alliance within the '*Crithmo-Limonion* Br.-Bl. et Molinier 1934'. (LM)

- *Staticion dalmaticum* Horvatić 1934 (34a)
- *Limonion dalmaticum* Horvatić 1934 *nom. mut. propos.* (*mut.illeg.*)
- *Allio-Astragalion* Lovrić 1971 (2b)

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CRI-01E *Crithmo-Frankenion hirsutae* Mayer 1995

Rupicolous herb-rich vegetation of salt-sprayed cliffs of peninsular Hellas and the Aegean islands

- *Crithmo-Limonion graeci* Géhu et al. 1992 (3f, 8)
- *Cichorio-Limonion roridi* S. Brullo et Guarino 2000 (5)

CRI-01F *Kochio prostratae-Limonion meyeri* Korzhenevskii 1987

Rupicolous herb-rich vegetation on salt-sprayed rock cliffs of the Crimean coasts

CRI-02 *Helichrysetalia italici* Biondi et Géhu in Géhu et Biondi 1994

Sub-aerohaline coastal dwarf scrub on inland edges of salt-sprayed cliffs of the Mediterranean seaboards

cri08 The communities of this order are found in a natural ecotone between the coastal vegetation under direct influence of sea-born salt spray and the coastal tomillar/phrygana and garrigue occupying coastal habitats, yet without marked influence of air-borne salt. This transitional position would suggest that this order might be classified either within the *Rosmarinetea* (at least in the Western and Central Mediterranean) or within the *Crithmo-Staticetea*. The original (Géhu & Biondi 1994) classification of this order within the *Helichryso-Crucianelletea maritimae* is not logical as the *Helichryso-Crucianelletea maritimae* was coined to capture vegetation of stabilized grey hind dunes (see Bon & Géhu 1973), hence soft sedimentary substrates, whereas the *Helichrysetalia italici* comprise communities of hard-rock, coastal cliff habitats. The intricacy of this situation comes to light in a paper by Biondi (2007) who classified a part of the *Helichrysetalia italici* within the *Rosmarinetea* or the *Helichryso-Crucianelletea* while the other part (*Senecionetalia cinereae*, with the type alliance *Anthyllidion barbae-jovis*) was classified in the *Crithmo-Staticetea*. (LM)

- *Senecionetalia cinereae* Biondi 2007 (syntax.syn.)

WESTERN MEDITERRANEAN AND CANTABRO-ATLANTIC GROUP OF ALLIANCES

CRI-02A *Dactylido hispanicae-Helichrysion stoechadis* Géhu et Biondi in Géhu 1994

Coastal dwarf scrub on salt-sprayed cliffs of the coasts of Southern France and the Cantabro-Atlantic region of the Iberian Peninsula

CRI-02B *Astragalion tragacanthae* (Folch ex Rivas-Mart., Fernández-González et Loidi 1999) Rivas-Mart. et al. 2002

Rupicolous pulvinate scrub on the wind-exposed coastal rocks of the coasts of Southern Spain and Portugal

- *Crithmo-Helichrysion serotini* Rothmaler 1943 (3f)

cri09 The protologue of this alliance (Rothmaler 1943) contains one validly described association (*Astragaletum vicentinum* Rothmaler 1943). The eponymous species *Helichrysum serotinum* is found in the table of the latter association yet there is no *Crithmum* (presumably *C. maritimum*) mentioned in the original diagnosis and therefore, the name remains invalidly published (ICPN art. 3f). (LM)

- *Astragalion tragacanthae* (Folch ex Rivas-Mart. et al. 1999) Rivas-Mart. et al. 2001 (2b)

CRI-02C *Launaeion cervicornis* (O. de Bolòs et Vigo ex Gil et Llorens 1995) Rivas-Mart. et al. 1999

Coastal pulvinate scrub on salt-sprayed cliffs of the Balearic Islands

- *Launaeion cervicornis* O. de Bolòs et Vigo 1984 (2b)

CRI-02D *Euphorbion pithyusae* Biondi et Géhu in Géhu et Biondi 1994

Thermomediterranean subsaline chamaephytic garrigue on coastal cliffs of Corsica and Sardinia

- *Loto cytisoidis-Helichrysion italici* Géhu et Biondi 1984 (phantom)
- *Loto cytisoidis-Helichrysion italici* Géhu et Biondi in Géhu 1994 (2b, 5)
- *Helichrysion italici* Paradis et Piazza 1995 (2b, 5)

CRI-02E *Anthyllidion barbae-jovis* S. Brullo et De Marco 1989

Subaerohaline coastal dwarf scrub on salt-sprayed cliffs of the eastern Tyrrhenian Sea

- *Plantagini-Thymelaeion hirsutae* Bartolo et S. Brullo in Bartolo et al. 1992 (5)
- *Plantagini-Thymelaeion hirsutae* Bartolo et S. Brullo ex Mayer 1995 (syntax.syn.)
- *Helichrysion litorei* Biondi 2007 (syntax.syn.)
- *Helichrysion litorei* Biondi in Biondi et al. 2013 (31)

CENTRAL-EASTERN MEDITERRANEAN AND EUXINIC GROUP OF ALLIANCES

CRI-02F *Crucianellion rupestris* S. Brullo et Furnari 1990

Subaerohaline dwarf scrub on salt-sprayed cliffs of the European and North African coasts of the Lybian Sea

- *Crucianellion rupestris* S. Brullo et Furnari 1981 (2b, 5)

CRI-02G *Elytrigio bessarabicae-Lactucion tataricae* Korzhenevskii ex Didukh et Mucina *all. nov. hoc loco*

Subaerohaline grasslands on limestone boulder-pebble beaches of Crimea

cri10 Korzhenevskii (2001) designated the *Crithmo-Elytrigietum bessarabicae senecionetosum bicoloris* as the 'type' of the *Crithmo-Elytrigietum bessarabicae* Korzhenevskii 2001. This is unacceptable according to the IPCN (a type of an association must be a relevé, not one of its subordinate syntaxa). Therefore we validate here the *Crithmo-Elytrigietum bessarabicae* Korzhenevskii 2001 by selecting its *holotypus hoc loco* (Korzhenevskii 2001: Tab. 5, rel. 1) and use this validated association as the nomenclature type (*holotypus hoc loco*) of the *Elytrigio bessarabicae-Lactucion tataricae*. The diagnostic species of the alliance are listed in Tab. 5 in Korzhenevskii (2001: 119). (LM, YD)

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- *Lactuco tatarici-Elytrigion bessarabicae* Korzhenevskii et Kliukin 1990 (1)
- *Lactuco tatarici-Elytrigion bessarabicae* Korzhenevskii 2001 (5)

CRI-03 *Crithmo-Armerietalia maritimae* Géhu et Géhu-Franck 1984

Subaerohaline coastal grasslands on inland edges of salt-sprayed rocky cliffs of the temperate and boreal European Atlantic coasts

- *Crithmo-Armerietalia maritimae* Géhu 1964 (2b)
- *Crithmo-Armerietalia maritimae* Géhu 1965 (2b)
- *Brassico oleraceae-Lavateretalia arboreae* Rivas-Mart. in Rivas-Mart. et al. 2011 (syntax.syn)

cri11 This order (for the protologue see Rivas-Martínez et al. 2011: 437) is composed from two ecologically and biogeographically disparate alliances (*Brassicion oleraceae* and *Medicagini citrinae-Lavaterion arboreae*; see Rivas-Martínez et al. 2011: 240–241) and therefore this syntaxonomic concept is contentious. Equally problematic is the classification of this putative order in the *Artemisietea vulgaris*. Because the *Brassicion oleraceae* has been designated as the holotype, we synonymize this order with the *Crithmo-Armerietalia*. (LM)

CRI-03A *Silenion maritimae* Maloch 1971

Subaerohaline coastal grasslands on inland edges of salt-sprayed rocky cliffs of the Atlantic coasts of the Iberian Peninsula, France ans southern coasts of Great Britain

- *Crithmo-Armerion maritimae* Géhu 1968 (2b)

cri12 This alliance should be included into the *Crithmo-Staticion* Molinier 1934, and this broadly conceived unit would then characterize both the Western Mediterranean and Atlantic coastlines, as far north as to the southern boreal zone. (KD)

- *Sileno maritimae-Festucion pruinosae* Géhu 2000 (31)
- *Sileno maritimae-Festucion pruinosae* Géhu et Bioret 2000 (syntax.syn.)
- *Sileno maritimae-Festucion pruinosae* Géhu in Bardat et al. 2004 (31)
- *Brassicion oleraceae* Rivas-Mart. et al. 1999 (syntax.syn.)

CRI-03B *Cochleario officinalis-Armerion maritimae* Géhu et Géhu-Franck 1984

Subaerohaline coastal grasslands on inland edges of salt-sprayed rocky cliffs of the boreo-atlantic coasts of Scotland and Iceland

CRI-04 *Frankenio-Astydamietalia* Santos 1976

Rupicolous vegetation of salt-sprayed coastal cliffs of the Canary Islands, Madeira and the Azores

CRI-04A *Frankenio-Astydamion latifoliae* Santos 1976

Vegetation of salt-sprayed coastal cliffs of the Canary Islands

CRI-04B *Euphorbio azoricae-Festucion petraeae* Lüpnitz 1976

Vegetation of salt-sprayed coastal cliffs of the Azores

- *Festucion petraeae* Sjögren 1973 (2b)

CRI-04C *Helichrysion obconico-devium* Rivas-Mart. et al. 2002

Vegetation of salt-sprayed coastal cliffs of Madeira

CAK *Cakiletea maritimae* Tx. et Preising in Tx. ex Br.-Bl. et Tx. 1952

Pioneer halo-nitrophilous short-lived vegetation in strandlines of sandy and shingle beaches of the coasts of the North Atlantic and Arctic Oceans, the Mediterranean and the Black Sea

- *Cakiletea maritimae* Tx. et Preising in Tx. 1950 (2b)
- *Cakileto-Therosalicornietea* Pignatti 1952 p.p. (orig.form) (2b)
- *Cakileto-Therosalicornietea* Pignatti 1953 (orig.form) (syntax.syn.)
- *Cakiletea maritimae* Tx. et Preising in Tx. ex Oberd. 1952 (2b)
- *Cakiletea integrifoliae* Tx. et Preising in Tx. 1950 *corr.* Rivas-Mart. et al. 1992 (2b, *corr.superfl.*)

CAK-01 *Atriplicetalia littoralis* Sissingh in Westhoff et al. 1946

Pioneer halo-nitrophilous strandline vegetation of cold-temperate and boreal strandlines of the North Atlantic Ocean and the Baltic Sea

- *Cakiletalia* Oberd. 1949 (2b)
- *Cakiletalia maritimae* Tx. in Oberd. 1949 (phantom)
- *Cakiletalia maritimae* Tx. 1950 (2b)
- *Cakiletalia maritimae* Tx. in Br.-Bl. et Tx. 1950
- *Cakiletalia maritimae* Pignatti 1962 (2b)
- *Cakiletalia maritimae* Tx. in Br.-Bl. et Tx. 1952 (syntax.syn.)
- *Cakiletalia maritimae* Pignatti 1953 (31)
- *Honckenyo-Crambetalia maritimae* Géhu 1968 (syntax.syn.)
- *Honckenyo-Crambetalia maritimae* Géhu et J. Géhu 1969 (31)
- *Cakiletalia integrifoliae* Tx. 1950 *corr.* Rivas-Mart. et al. 1992 (2b, *corr.superfl.*)

cak01 The mutation of the *Cakiletalia integrifoliae* Tx. 1950 by Rivas-Martínez et al. (1992) is superfluous as the original name was invalid at the time the mutation was performed. (LM)

CAK-01A *Atriplicion littoralis* Nordhagen 1940

Pioneer halo-nitrophilous vegetation of silty strandlines of the North Atlantic Ocean and the Baltic Sea

cak02 Pignatti (1954: 50) used this syntaxonomic concept to accommodate two associations, namely the '*Matricario maritimae-Atriplicetum litoralis* (Christ. 1933) Tx. 1950' and the 'Ass. A *Kochia scoparia* e *Chenopodium ambrosioides* Pign. 1953 provv.'. The latter is obviously invalid (ICPN art. 3b) and represents a ruderal community close to the *Atriplicion* Passarge 1978 (*Sisymbrietalia*). The former community is dominated by annuals and described from the Italian Adriatic coast and hence does not match the original concept of the *Atriplicion littoralis sensu* Nordhagen (1940). The *Matricario-Atriplicetum littoralis* is a community of the Mediterranean *Euphorbion peplidis* Tx. ex Oberd. 1952. (LM)

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- *Cakilion* Oberd. 1949 (2b)
- *Cakilion* Oberd. 1950
- *Atriplici laciniatae-Salsolion kali* Géhu 1975
- *Atriplici sabulosae-Salsolion kali* Géhu 1975 *nom. mut. propos.* (45)
- *Tanaceto-Artemision vulgaris* Golub et al. 2005 (syntax.syn.)

CAK-01B *Salsolo-Minuartion peploidis* Tx. in Br.-Bl. et Tx. 1952

Pioneer halo-nitrophilous vegetation of sandy and gravelly strandlines of the North Atlantic Ocean and the Baltic Sea

- *Salsolo-Minuartion peploidis* Tx. 1950 (2b)
- *Salsolo-Honckenyion peploidis* Tx. 1950 *nom. mut. propos.* (*mut.illeg.*)
- *Salsolo-Minuartion peploidis* Tx. in Tx. et Böckelmann 1957 (31)
- *Honckenyo-Crambion maritimae* Géhu 1968 (syntax.syn.)

cak03 This alliance (*Honckenyo-Crambion maritimae*) is validly published since in the protologue (Géhu 1968), it contains two validly published associations (*Crithmo-Crambetum maritimae* Géhu 1960, *Lavateretum arboreae* J.-M. Géhu et J. Géhu 1961). The *Crithmo-Crambetum maritimae* Géhu 1960 is selected as the *lectotypus hoc loco*. (LM)

- *Honckenyo-Crambion maritimae* Géhu et J. Géhu 1969 (31)
- *Honckenyo latifoliae-Crambion maritimae* Géhu et J. Géhu 1969 *corr*. Géhu 1998 (43)

CAK-01C *Agropyro-Rumicion* Nordhagen 1940 *nom. ambig. rejic. propos.*

Pioneer halo-nitrophilous vegetation of coastal shingle beaches of the boreo-atlantic coasts of the Baltic and North Seas

cak04 The *Agropyro-Rumicion crispi* Nordhagen 1940 has been described as communities of maritime strandline communities. However, that name has later been used predominantly for inland communities of flooded pastures (e.g. Pott 1995). The true *Agropyro-Rumicion crispi* communities and the inland communities of flooded pastures (correct name as applied here: *Potentillion anserinae* Tx. 1947 in the *Molinio-Arrhenathereteа*) have little in common, except for *Rumex crispus* and *Potentilla anserina* (Sýkora 1980). Because of the frequent misapplication of the name *Agropyro-Rumicion crispi* in a way that excludes its nomenclatural type, the *Agropyro-Rumicion crispi* becomes a candidate for *nomen ambiguum* (see also Theurillat 1997). (JD, LM)

- *Elytrigio-Rumicion crispi* Nordhagen 1940 *nom. mut. propos.* (*mut.superfl.*)
- *Elymo littorei-Rumicion crispi* (Nordhagen 1940) Isermann et Dengler in Isermann 2004 (29a, *nom. nov. illeg.*)

CAK-02 *Cakiletalia edentulae* Thannheiser 1981

Pioneer halo-nitrophilous strandline vegetation of the boreo-arctic and European and North American coasts of the Atlantic and Arctic Oceans

cak05 This order could be included in the *Atriplicetalia littoralis*. (KD)

- *Cakiletalia edentulae americana* Tx. 1950 (2b)

CAK-02A *Cakilion edentulae* Thannheiser 1981

Pioneer halo-nitrophilous strandline vegetation of the boreo-atlantic European and the Azorean coasts

cak06 This alliance could be included in the *Atriplicion littoralis*. (KD)

CAK-02B *Atriplicion nudicaulis* Golub et al. 2003

Pioneer halo-nitrophilous strandline vegetation of the Arctic White Sea coasts

CAK-03 *Thero-Atriplicetalia* Pignatti 1953

Pioneer halo-nitrophilous strandline vegetation of the Cantabro-Atlantic, the Mediterranean and the Black Sea coasts

cak07 The *Thero-Atriplicetalia* (Pignatti 1953: 69) is validly published because the *holotypus* of the order, the *Thero-Atriplicion* Pignatti 1953 (syntaxonomic synonym of the older *Euphorbion peplidis* Tx. ex Oberd. 1952) was validly published. (LM)

- *Euphorbietalia peplidis* Tx. 1950 (2b)
- *Thero-Atriplicetalia* Pignatti 1952 (2b)
- *Euphorbietalia peplidis* Tx. ex Rivas Goday et Rivas-Mart. 1958 (syntax.syn.)

CAK-03A *Euphorbion peplidis* Tx. ex Oberd. 1952

Pioneer halo-nitrophilous strandline vegetation of the Cantabro-Atlantic and the Mediterranean coasts

- *Euphorbion peplidis* Tx. 1950 (2b)
- *Salsolo-Polygonion maritimi* Pignatti 1952 (2b)
- *Thero-Atriplicion* Pignatti 1952 (2b)
- *Cakilion litoralis* Pignatti 1953 (3L)
- *Cakilion maritimae* Pignatti 1953 (phantom)
- *Salsolo-Polygonion maritimi* Pignatti 1953 (2b)
- *Thero-Atriplicion* Pignatti 1953 (syntax.syn.)

cak08 Pignatti (1953: 69–70) validly described two associations ('Ass. ad *Atriplex triangularis* Pign. 1953' and 'Ass. ad *Atriplex tatarica* Ubrizsy 1949') within the *Thero-Atriplicion*. I suggest that the name *Atriplicetum tataricae* Ubrizsy 1949 is probably misapplied for the *Atriplex tatarica* community from the Laguna di Veneto region. Ubrizsy's (1949) community is a typically ruderal unit classified within the *Atriplicion* (see for instance Jarolímek et al. 1997). Therefore, here we typify the *Thero-Atriplicion* by choosing the 'Ass. ad *Atriplex triangularis* Pign. 1953' (*recte*: *Atriplicetum triangularis* Pignatti 1953) as the *lectotypus* of the alliance. (LM)

- *Glaucio-Cakilion maritimae* O. de Bolòs 1962
- *Cakilion aegyptiacae* Rivas-Mart. et M. Costa in Rivas-Mart. et al. 1980

CAK-03B *Cakilion euxinae* Géhu et al. 1994

Pioneer halo-nitrophilous strandline vegetation of the Black Sea coasts

cak09 This unit could possibly be incorporated in the *Euphorbion peplidis* since it is differentiated from the latter only by the occurrence of *Cakile maritima* subsp. *euxina* and its limited distribution to the shores of the Black Sea. (LM)

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- *Cakilion maritimae* Morariu 1957 (31)
- *Cakilo euxinae–Crambion maritimae* Golub et al. 2006 (syntax.syn.)

AMM *Ammophiletea* Br.-Bl. et Tx. ex Westhoff et al. 1946

Tall-grass perennial swards on mobile coastal dunes of the seaboards of Europe, North America, Greenland, North Africa, Middle East and the Caspian Sea

amm01 In the region covered by this paper, the *Ammophiletea* comprises three orders, namely the cool and warm-temperate *Ammophiletalia*, the cold temperate and Arctic-Eurasian *Honckenyo-Elymetalia arenarii* (sometimes considered as a class in its own right, the *Honckenyo-Elymetea arenarii*), and the Arctic-North American *Ammophiletalia brevilingulatae*. (LM)

- *Ammophiletea* Br.-Bl. 1933 (phantom)
- *Ammophiletea* Br.-Bl. et Tx. 1943 (2b)
- *Ammophiletea* Tx. in Knapp 1943 (1)
- *Ammophiletea* Br.-Bl. et Tx. in Br.-Bl. et al. 1952 (31)
- *Elymetea arenarii* Géhu 1964
- *Honckenyo-Elymetea arenarii* Tx. 1966 (syntax.syn.)
- *Honckenyo-Leymetea arenarii* Tx. 1966 *nom. mut. propos.* (45)

amm02 Rivas-Martínez et al. (2002a: 263) formally suggested this name change. (LM)

- *Elymo-Ammophiletea* Géhu-Franck 1969 (29)
- *Euphorbio paraliae-Ammophiletea arundinaceae* Géhu et Géhu-Franck 1988 (29)
- *Euphorbio paraliae-Ammophiletea australis* Géhu et Géhu-Franck 1988 *corr*. Géhu 1998 (43)
- *Euphorbio paraliae-Ammophiletea australis* Géhu et Géhu-Franck 1988 *corr*. Géhu in Bardat et al. 2004 (43)
- *Euphorbio paraliae-Ammophiletea australis* Géhu et Rivas-Mart. in Rivas-Mart. et al. 2011 (5)

GROUP OF ORDERS OF MOBILE COASTAL DUNES

AMM-01 *Ammophiletalia* Br.-Bl. et Tx. ex Westhoff et al. 1946

Tall-grass perennial swards on mobile white and embryonic coastal dunes of the warm-temperate to boreo-atlantic coasts of the Mediterranean and the Black and Caspian Seas

- *Ammophiletalia* Br.-Bl. 1931 (2b)
- *Ammophiletalia* Br.-Bl. 1932 (2b)
- *Ammophiletalia* Br.-Bl. 1933 (2b)
- *Ammophiletalia australis* Br.-Bl. 1933 (2b, *mut.superfl.*)
- *Ammophiletalia* Br.-Bl. et Tx. 1943 (2b)
- *Elymetalia arenarii* Br.-Bl. et Tx. 1943 (2b)
- *Leymetalia arenarii* Br.-Bl. et Tx. 1943 (2b, *mut.superfl.*)
- *Elymetalia* Oberd. 1949 (2b)
- *Elymetalia arenarii* Br.-Bl. et Tx. in Br.-Bl. et Tx. 1952
- *Elymetalia arenarii* Br.-Bl. et Tx. ex Fröde 1958
- *Leymetalia arenarii* Br.-Bl. et Tx. ex Fröde 1958 (31, *mut.superfl.*)
- *Elymo-Ammophiletalia arenariae* Géhu-Franck 1969 (phantom)
- *Elymo-Ammophiletalia arenariae* Géhu et J. Géhu 1969 (syntax.syn.)
- *Euphorbio-Ammophiletalia* Géhu et J. Géhu 1969 (syntax.syn.)
- *Elymetalia gigantei* Vicherek 1971 *nom. mut. propos.* (45)

amm03 The syntaxonomic content of this unit has not been fully understood by Géhu (1996) who assigned the '*Elymetalia gigantei* Vicherek 1972' and the *Elymion gigantei* Vicherek 1972 into the *Honckenyo-Elymetea*. Géhu's (1996: Tab. 1) synoptic table does not support his interpretation. The recognition of the *Elymetalia gigantei* Vicherek 1972 remains open to various interpretations. (LM)

- *Leymetalia gigantei* Vicherek 1971 *nom. mut. propos*. (45)
- *Ammophiletalia arundinaceae* Géhu 1988 (31)

AMM-01A *Ammophilion* Br.-Bl. 1921

Tall-grass perennial swards on mobile white and embryonic coastal sand dunes of the Mediterranean

amm04 Braun-Blanquet (1921: 347) named this alliance first as '*Ammophilion littori-arenariae*', however renamed it in the same line as '*Ammophilion*'. This unit is validly published since it clearly contains the validly published '*Ammophila-Medicago marina*-Assoziation' (documented in the same paper by a table containing 8 relevés). (LM)

- *Ammophilion littori-arenariae* Br.-Bl. 1921 (34a)
- *Ammophilion* Br.-Bl. 1933 (2b)
- *Agropyrion juncei* Pignatti 1953 (syntax.syn.)
- *Agropyrion mediterraneum* Géhu et Géhu-Franck 1969 (2b)
- *Euphorbio-Ammophilion arenariae* Géhu et Géhu-Franck 1969 (29)
- *Ammophilion australis* Br.-Bl. 1933 *corr*. Rivas-Mart. et al. in Rivas-Mart. et al. 1990 (2b, *corr.superfl.*)
- *Ammophilion arundinaceae* Br.-Bl. 1921 *corr*. Géhu et al. in Rivas-Mart. et al. 1990 (2b, *corr.superfl.*)
- *Zygophyllion albi* Géhu et al. 1990 (phantom)
- *Zygophyllion albi* Géhu et al. 1991 (syntax.syn.)

amm05 Although Géhu et al. (1991: 218) have classified the *Zygophyllion albi* within the '*Arthrocnemetea fruticosi*' (*recte*: *Salicornietea fruticosae*), six of ten species listed in the relevé table of the *holotypus* of this alliance (the *Elymo farcti-Zygophylletum albi*; Tab. 3) are character species of the *Ammophiletea* and/or its subordinate syntaxa, and two are typical *Cakiletea maritimae* elements. (LM)

- *Ammophilion australis* Br.-Bl. 1921 *corr*. Géhu 1998 (43)
- *Sporobolion arenarii* (Géhu et Géhu-Franck ex Géhu et Biondi 1994) Rivas-Mart. et al. 2001 (2b)
- *Sporobolion arenarii* (Géhu et Géhu-Franck in Géhu et Biondi 1994) Rivas-Mart. et al. 2002 (syntax.syn.)

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amm06 The vegetation of the embryonic dunes is classified by some authors within an alliance in its own right, the *Sporobolion arenarii*, or at least into an informal group of associations (such as the '*Sporoboleta arenarii*'; Géhu 1996). The floristic and ecological differences between the vegetation of the embryonic and white dunes still remains to be convincingly demonstrated. (LM)

AMM-01B *Elymion gigantei* Morariu 1957

Tall-grass perennial swards on mobile and embryonic coastal sand dunes of the Black Sea

- *Leymion sabulosi* Morariu 1957 *nom. mut. propos.* (45)

AMM-01C *Elymion arenarii* Christiansen 1927

Tall-grass perennial swards on mobile white and embryonic coastal dunes of the temperate North Atlantic Ocean

- *Psammion arenariae* Iversen 1936 (orig.form) (2b)
- *Elymion arenariae* Oberd. 1949 (orig.form) (2b)
- *Ammophilion borealis* Tx. in Br.-Bl. et Tx. 1952 (34a)
- *Ammophilion arenariae* Tx. 1955 (phantom)
- *Ammophilion borealis* Tx. 1955 (2b)
- *Elymo-Ammophilion* (Tx. 1955) Oberd et al. 1967 (2b)
- *Ammophilion arenariae* Géhu 1998 (31)

AMM-02 *Honckenyo-Elymetalia arenarii* Tx. 1966

Perennial grassy swards on rocky beaches, cliffs and embryonic dunes of the cold temperate and arctic shores of Europe, the European Arctic islands and Greenland

- *Honckenyo-Leymetalia arenarii* Tx. 1966 *nom. mut. propos.* (45)
- *Elymo-Ammophiletalia* Géhu et J. Géhu 1969 (syntax.syn.)
- *Leymetalia arenarii* (Tx. 1966) Géhu 1998 (29)

AMM-02A *Agropyro-Honckenyion peploidis* Tx. in Br.-Bl. et Tx. 1952 *nom. mut. propos.*

Perennial grassy swards on coastal foredunes of the cold-temperate Atlantic and the Baltic seaboards

amm07 Dengler in Berg et al. (2004: 587) formally suggested this name mutation. The Nomenclature Commission suggested approving the proposal (Willner et al. 2011). According to KD this alliance should be included in the *Elymion arenarii* (*recte*: *Ammophilion*). The latter opinion is shared by Bardat et al. (2004) who accepted Géhu's (1988a) proposal to handle this syntaxon as the suballiance '*Agropyro boreoatlantici-Minuartienion peploidis* (Tüxen in Braun-Blanq. & Tüxen 1952) Géhu 1988' within the *Ammophilion*. (LM)

- *Agropyro-Minuartion peploidis* Tx. 1945 (1)
- *Agropyro-Minuartion peploidis* Tx. in Br.-Bl. et Tx. 1952 (orig.form) (30)
- *Elymo boreoatlanticae-Honckenyion peploidis* Tx. in Br.-Bl. et Tx. 1952 *nom. mut. propos.* (45)
- *Elytrigio boreoatlanticae-Honckenyion peoploidis* Tx. in Br.-Bl. et Tx. 1952 *nom. mut. propos.* (45)

amm08 It appears that yet another mutation of the original name '*Agropyro-Minuartion peploidis* Tx. in Br.-Bl. et Tx. 1952' is necessary. This time the name-giving taxon *Agropyron junceum* subsp. *boreoatlanticum* should be replaced with the currently valid *Elytrigia juncea* subsp. *boreoatlantica.* (LM)

- *Honckenyo peoploidis-Elytrigion boreoatlanticae* Tx. in Br.-Bl. et Tx. 1952 *nom. mut. propos. et nom. invers. propos.* (42, 45)

amm09 The formal proposal for inversion and mutation of the name (in form '*Honckenyo peoploidis-Elytrigion borealiatlanticae* Tx. in Br.-Bl. et Tx. 1952') was presented by Rivas-Martínez et al. (2002b: 448). The latter authors classified this alliance within the *Ammophiletalia.* (LM)

- *Honckenyo-Leymion arenarii* Tx. 1966 (syntax.syn.)
- *Agropyrion boreoatlanticum* Géhu et J. Géhu 1969 (34a)
- *Honckenyo-Elymion arenarii* Tx. 1970 (29)
- *Honckenyion peploidis* (Tx. 1966) G. Passarge et Passarge 1973 (29)
- *Lathyro-Elymion arenariae* G. Passarge et Passarge 1973 (syntax.syn.)
- *Agropyrion junceiformis* Géhu et al. ex Loriente 1978
- *Agropyrion junceiformis* (Tx. in Br.-Bl. et Tx. 1952) Rivas-Mart. et al. 1980 (29)
- *Juncion baltici* (Piotrowska 2002) Kącki in Kącki et al. 2013 (2b, 3b)

AMM-02B *Mertensio maritimae-Honckenyion diffusae* Tx. et Géhu in Géhu 1998

Perennial grassy swards on coastal shingle beaches of the subarctic and arctic coasts of Northern Europe, the Arctic Ocean archipelagos and Greenland

- *Honckenyo diffusae-Leymion mollis* Géhu 1998 (3f)
- *Tripleurospermion maritimi* Golub et al. 2003 (3b)
- *Matricarion maritimi* Golub et al. in Golub et Sorokin 2007 (syntax.syn.)

AMM-03 *Ammophiletalia breviligulatae* Galiano 1959

Perennial grassy swards on rocky and sandy and shingle beaches of the shores of Greenland and North America

AMM-03A *Honckenyo diffusae-Leymion mollis* Géhu 1999

Perennial grassy swards on rocky and sandy and shingle beaches of the shores of Greenland

CRU *Helichryso-Crucianelletea maritimae* Géhu et al. in Sissingh 1974

Atlantic, Mediterranean and Euxinian dwarf scrub and grasslands on stabilized coastal grey hind dunes

cru01 While it is floristically and ecologically well justified to separate the vegetation of the stabilized grey dunes from that of mobile embryonic dunes and white dunes (*Ammophiletea*) at the class level, there are no convincing floristic and/or ecological reasons to place some of the temperate grey dune communities in the

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Koelerio-Corynephoretea while others are grouped in a separate class, the *Helichryso-Crucianelletea maritimae*. Following Dengler (2001, 2003), the majority of units presently listed under the latter class should be included in the *Koelerio-Corynephoretea.* (JD) Some other authors (e.g. (Julve 1993; Rivas-Martínez et al. 2001: 195) also share this opinion. Interestingly, in a vegetation survey in 1999, J.-M. Géhu gave up his own concept of the *Helichryso-Crucianelletea* by incorporating the *Crucianelletalia maritimae* Sissingh 1974 into the *Ammophiletea* (see also Sýkora et al. 2003; Tzonev et al. 2005). Yet we argue (supported by Italian and Spanish studies, *e.g.* Esposito & Filesi 2007; Rivas-Martínez et al. 2011) that the ecotone linking the mobile dunes on one side and coastal sandy grasslands on the other creates a unique habitat supporting an exclusive species pool rich in herbs and dwarf shrubs (including many regional and pan-mediterranean endemics) that shapes unique vegetation classified as a class in its own right, the *Helichryso-Crucianelletea*. (LM)

- *Crucianelletea* Géhu et al. in Bon et Géhu 1973 (2b, 3b)
- *Crucianelletea* Géhu et al. in Sissingh 1974 (3b)
- *Koelerio-Crucianelletea* Sissingh 1974 (2b)
- *Helichryso-Crucianelletea maritimae* Géhu et al. in Géhu 1975 (31)

CRU-01 *Artemisio-Koelerietalia* Sissingh 1974

Sandy grasslands and scrub on base-rich stabilized grey hind dunes of the shores of the cool-temperate Atlantic Ocean and the northern seaboards of the Ligurian and Adriatic Seas

- *Avenetalia pubescentis* Doing Kraft in Boerboom 1957 (2b)
- *Cerastietalia semidecandri* (Glowacki 1988) Julve 1993 (3b)
- *Cladonio-Koelerietalia* Weeda, Doing et Schaminée in Schaminée et al. 1996 (29)
- *Helichrysetalia arenarii* de Foucault 1999 (phantom)
- *Phleo arenarii-Cerastietalia pentandri* (Glowacki 1988) de Foucault 1999 (phantom)
- *Helichrysetalia arenarii* de Foucault 2001 (2b)
- *Phleo arenarii-Cerastietalia pentandri* de Foucault 2001 (5)

CRU-01A *Koelerion arenariae* Tx. 1937 *corr.* Gutermann et Mucina 1993

Sandy grasslands on base-rich stabilized grey hind dunes of the North Sea coasts

cru02 The formal correction of this name was performed in Gutermann & Mucina (1993). (LM)

- *Koelerion albescentis* Tx. 1937 (43)
- *Galio-Koelerion* (Tx. 1937) Westhoff et Den Held 1969 (29)
- *Phleo-Koelerion* Doing 1974
- *Euphorbio-Festucion dumetori* Géhu 1975 (syntax.syn.)
- *Tortulo-Koelerion* (Tx. 1937) Weeda, Doing et Schaminée in Schaminée et al. 1996 (29)
- *Phleo arenarii-Cerastion diffusi* de Foucault 1999 (phantom)
- *Phleo arenarii-Cerastion diffusi* de Foucault 2001 (2b)
- *Koelerion arenariae* Tx. 1937 *corr*. Rivas-Mart. et al. 2002 (*corr.superfl.*)

cru03 Rivas-Martínez et al. (2002a: 266) formally suggested this name change. These authors have overlooked the earlier published proposal made by Gutermann & Mucina (1993). (LM)

CRU-01B *Euphorbio portlandicae-Helichrysion stoechadis* Sissingh 1974

Sandy grasslands and dwarf scrub on base-rich stabilized grey hind dunes of the francoatlantic shores of the Atlantic Ocean

- *Euphorbio portlandicae-Helichrysion stoechadis* Géhu et Tx. 1972 (phantom)
- *Helichrysion stoechadis* Géhu et Tx. in Bon et Géhu 1973 (2b)

CRU-01C *Diantho catalaunici-Scrophularion humifusae* Baudière et Simonneau 1974

Sandy grasslands and dwarf scrub on base-rich stabilized grey hind dunes of the shores of the Gulf of Lion (Languedoc and Northern Catalonia)

CRU-01D *Syntrichio-Lomelosion argenteae* Biondi, Sburlino et Theurillat in Sburlino et al. 2014

Sandy grasslands and dwarf scrub on base-rich stabilized grey hind dunes of the shores of the Gulf of Venice (Adriatic Sea)

- *Psammo-Koelerion* Pignatti 1952 (29c)

cru04 The name '*Psammo-Koelerion* Pign. 1953' in Pignatti (1952a) is a superfluous name of the *Koelerion albescentis* Tüxen 1937' [*recte*: *Koelerion arenariae* Tx. 1937 *corr*. Gutermann et Mucina 1993a, 1993b]. Indeed Pignatti (1952): 323) explicitly cited the name '*Psammo-Koelerion*' as corresponding to the *Koelerion albescentis* Tüxen 1937 in a broad sense and the unique association of the original diagnosis of the *Koelerion albescentis* Tüxen 1937, the '*Tortuleto-Phleetum* Br.-Bl. et De Leeuw (1936) Tx. 1937', was also included in the diagnosis of the *Psammo-Koelerion* together with three other associations. Pignatti's paper was published as a sequel to a series of papers published in 1952 (Archivio Botanico 28: 265–329) and in 1953 (Archivio Botanico 29: 1–25, 65–98, 129–174); the bibliographical reference to Tüxen (1937) is given on p. 173 of Archivio Botanico, volume 29. Since we established that there had not been any later, validly published and legitimate name for the *Psammo-Koelerion* Pignatti 1952, a new name, the *Syntrichio-Lomelosion argenteae*, was coined by Sburlino et al. (2014). (JPT)

- *Psammo-Koelerion* Pignatti 1953 (phantom)

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CRU-02 *Crucianelletalia maritimae* Sissingh 1974

Mediterranean and Cantabro-Francoatlantic dwarf scrub and grasslands on stabilized coastal hind dunes

cru05 Bardat et al. (2004) consider this order a synonym of the *Ammophiletalia.* (LM)

- *Artemisietalia crithmifoliae* Br.-Bl., Rozeira et Silva in Br.-Bl. et al. 1972 *nom. dubium* (38)

cru06 Rivas-Martínez et al. (2011: 194) consider the *Artemisietalia crithmifoliae* to be a *nomen dubium.* Although these authors have not suggested any grounds to underpin this decision, one could assume that it was motivated by the original claim made by Braun-Blanquet et al. (1972) who suggested that all dune vegetation in Portugal should be classified as a single order (*Artemisietalia crithmifoliae*), comprising one alliance (*Linario-Vulpion*). Braun-Blanquet et al. (l.c.) classified within the latter alliance also the *Eryngio-Honckenyetum, Agropyro-Otanthetum, Armerio-Crucianelletum* and *Scrophulario-Vulpietum*. From the current point of view, this is a mix of the *Ammophiletalia, Crucianelletalia maritimae*, and *Brometalia rubenti-tectorum* units. (JC, LM)

- *Helichryso-Crucianelletalia maritimae* Géhu et al. 1973 (2b)
- *Helichryso-Crucianelletalia maritimae* (Sissingh 1974) Géhu et al. in Géhu 1975 (29)

CRU-02A *Crucianellion maritimae* Rivas Goday et Rivas-Mart. 1958

Western and Central Mediterranean dwarf scrub on stabilized coastal hind dunes

- *Ononidion ramosissimae* Pignatti 1952 (2b)

CRU-02B *Helichrysion picardii* (Rivas-Mart., M. Costa et Izco in Rivas-Mart. et al. 1990) Rivas-Mart. et al. 1999

Iberoatlantic dwarf scrub on stabilized coastal hind dunes

- *Iberidion procumbentis* Bellot 1966
- *Helichrysion picardii* (Rivas-Mart., M. Costa et Izco in Rivas-Mart. et al. 1990) Géhu 1990 (8)

cru07 This name is invalid because Géhu (1999) failed to indicate clearly the original diagnosis of the presumed sub-alliance to be elevated to the rank of alliance. (LM)

CRU-02C *Helichryso barrelieri-Centaureion spinosae* Mucina et Dimopoulos *all. nov. hoc loco*

Aegean and Marmarean hemisphaeric-scrub coastal phygana on stabilized coastal hind dunes

cru08 The *Helichryso barrelieri-Centaureion spinosae* is herein formally described to accommodate the hemisphaeric- scrub *Centaurea spinosa*-dominated communities on stabilized coastal hind dunes; these represent a characteristic type of coastal dune phrygana in the Eastern Mediterranean region. *Centaurea spinosa* is an important floristic element of at least three vegetation classes, the *Crithmo-Staticetea*, *Ammophiletea* and *Cisto-Micromerietea* (Mayer 1995). However, the alliance described represents yet another vegetation type (co-) dominated by *Centaurea spinosa* and *Sarcopoterium spinosum* occurring on stabilized hind dunes, a typical habitat of the *Helichryso-Crucianelletea maritimae*. We assign the *Thymbro capitatae-Centaureetum spinosae* (the original erroneous spelling: '*Timbro capitatae-Centaureetum spinosae*') of Géhu (1991: 35, Tab. 2) as the *holotypus (hoc loco)* of the *Helichryso barrelieri-Centaurion spinosae,* and list *Anthyllis hermanniae, Centaurea spinosa, Cichorium spinosum, Helichrysum stoechas* subsp. *barrelieri, Linum strictum* subsp. *spicatum* and *Silene colorata* as the diagnostic taxa of the new alliance. (LM, PD)

CRU-03 *Medicago-Seselietalia tenderiensis* Umanets et V. Solomakha 1999

Grasslands and dwarf-scrub vegetation on stabilized coastal hind dunes of the Black and Azov Seas

CRU-03A *Sileno thymifoliae-Jurineion kilaeae* Géhu et Uslu ex Mucina *all. nov. hoc loco*

Grasslands and dwarf-scrub vegetation on stabilized hind dunes of the southwestern coasts of the Black Sea

cru09 The name of this alliance was suggested by Géhu et Uslu (1989: 504). On p. 470 Tab. 11, a list of 'species of the alliance' (obviously diagnostic or character species) was introduced. Of three associations ('*Stachyo subcrenatae-Centaureetum kilaeae* ass. nov.', '*Peucedano obtusifolii-Centaureetum beckeri* ass. nov.' and '*Sarcopoterio-Centaureetum spinosae* Secmen et Leblebici 1978 *nom. nov.*') assigned in the protologue to this alliance, none was designed as typus of the alliance and therefore the *Sileno thymifoliae-Jurineion kilaeae* was invalidly published and remained invalidly published also in Tzonev et al. (2005). Here I designate the validly described *Stachyo subcrenatae-Centaureetum kilaeae* Géhu et Uslu 1989 (Géhu & Uslu 1989: 470, Tab. 11) as the *holotypus (hoc loco)* of the *Sileno thymifoliae-Jurineion kilaeae*. (LM)

- *Sileno thymifoliae-Jurineion kilaeae* Géhu et Uslu 1989 (5)
- *Sileno thymifoliae-Jurineion kilaeae* Uslu et Géhu 1990 (2b)

CRU-03B *Scabiosion ucranicae* Sanda et al. 1980

Grasslands and dwarf-scrub vegetation on stabilized hind dunes of the eastern coasts of the Black Sea

- *Scabiosion argenteae* (Boşcaiu 1975) Popescu et Sanda 1987

CRU-03C *Cynodonto-Teucrion polii* Korzhenevskii et Kliukin 1990

Grasslands and dwarf-scrub vegetation on stabilized hind dunes of the northern and northeastern coasts of the Black and Azov Seas

- *Verbascion pinnatifidi* Korzhenevskii et Kliukin 1990 (1)
- *Melico chrysolepidis-Ephedrion distachyae* Umanets et V. Solomakha 1999 (syntax.syn.)

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VEGETATION OF ROCK CREVICES AND SCREES

ADI *Adiantetea* Br.-Bl. et al. 1952

Relict chomophytic and chasmophytic vegetation in the shaded and water-splashed habitats of the Mediterranean, the Atlantic islands, North Africa and Middle East

adi01 Zechmeister (1993) and Zechmeister & Mucina (1994) classify the contents of this class into the *Montio-Cardaminetalia* (*Montio-Cardaminetea*). Indeed these communities share many species (especially cryptogams) typical of the water-spring vegetation, but they also show ecological characteristics of chasmophytic vegetation typically classified within the *Asplenietea trichomanis* (substrate is raw bedrock, plants growing often in rock crevices, steep or vertical inclinations etc.). The relict character of the *Adiantetea* (which are also found in sheltered habitats of the North African and Arabian mountain ranges; Deil 1989, 1996, 1998) is yet another character shared with some of the Mediterranean *Asplenietea* units. We can presume that many of the habitats supporting *Adiantetea* today did not suffer from dramatic Pleistocene cyclic climatic change events (including glaciations), hence these micro-habitats might have continually supported this vegetation as remotely as the Middle and Upper Tertiary. The low species diversity and small species pool that contribute to the assembly of the *Adiantetea* communities make it difficult to make syntaxonomic judgements based purely on floristic-sociological criteria. It is rather its controversial transitional (between the *Asplenietea* and the *Montio-Cardaminetea*) as well as relict occurrence on a suite of endemic relicts that motivate preserving the identity of the *Adiantetea* as class in its own right. (LM) The name of the class was validly published for the first time in Braun-Blanquet et al. (1952) and the original diagnosis of the class contains the '*Adiantetalia* Br.-Bl. 1931' comprising the '*Adiantion* Br.-Bl. 1931' (both names invalidly published in Braun-Blanquet 1931). The unique association of the alliance, the '*Eucladieto-Adiantetum* Br.-Bl. 1931', was validly published in Br.-Bl. et al. (1952: a synoptic table), hence the correct name of the association becomes '*Eucladio-Adiantetum* Br.-Bl. in Br.-Bl. et al. 1952'. The latter association is the nomenclature type of the *Adiantion* Br.-Bl. in Br.-Bl. et al. 1952, which in turn, is the *typus* the *Adiantetalia* Br.-Bl. in Br.-Bl. et al. 1952. (LM) The latter alliance and order are both later homonyms (ICPN art. 31) of the names '*Adiantion* Br.-Bl. ex Horvatić 1934' and '*Adiantietalia* Br.-Bl. ex Horvatić 1934' to which reference is not made in Br.-Bl. et al. (1952). (JPT)

- *Adiantetea* Br.-Bl. et Tx. 1943 (2b)
- *Adiantetea* Br.-Bl. in Br.-Bl. et al. 1947 (2b)
- *Adiantetea* Br.-Bl. 1948 (2b)

ADI-01 *Adiantetalia* Br.-Bl. ex Horvatić 1934

Relict chomophytic and chasmophytic vegetation in shaded and water-splashed habitats of the Mediterranean, the Atlantic islands, North Africa and Middle East

- *Adiantetalia* Br.-Bl. 1931 (2b)
- *Adiantetalia* Br.-Bl. ex Horvatić 1939 (2b)
- *Adiantetalia* Br.-Bl. in Br.-Bl. et al. 1947 (2b)
- *Adiantetalia* Br.-Bl. 1948 (2b)
- *Adiantetalia* Br.-Bl. in Br.-Bl. et al. 1952 (31)
- *Pinguiculetalia longifoliae* Fernández Casas 1970 (syntax.syn.)

ADI-01A *Adiantion* Br.-Bl. ex Horvatić 1934

Relict fern-rich chasmophytic communities in shaded and water-splashed habitats of the Mediterranean, the Atlantic islands, North Africa and Middle East

- *Adiantion* Br.-Bl. 1931 (2b)
- *Adiantion* Br.-Bl. in Br.-Bl. et al. 1947 (2b)
- *Adiantion* Br.-Bl. in Br.-Bl. et al. 1952 (2b)

ADI-01B *Pinguiculion longifoliae* Fernández Casas 1970

Relict herb-rich chomophytic vegetation in shaded water-splashed habitats of the Mediterranean, North Africa and Middle East

- *Coeno-Pinguiculion* Deil 1989 (3d)

POD *Polypodietea* Jurko et Peciar ex Boşcaiu, Gergely et Codoreanu in Raţiu et al. 1966

Chomophytic, chasmophytic and epiphytic vegetation of fern- and moss-rich communities in crevices and on the surface of rocky cliffs of temperate and mediterranean Europe

pod01 The nomenclatural history of this class name, as well as of those of the *Anogrammo-Polypodietea* and the *Anomodonto-Polypodietea,* will be elucidated in a separate paper Theurillat et al. (in prep.). (LM)

- *Polypodietea* Jurko et Peciar 1963 (2b)
- *Anogrammo-Polypodietea* Rivas-Mart. 1975 (3f)
- *Anomodonto-Polypodietea serrati* Rivas-Mart 1975 (phantom)
- *Anomodonto-Polypodietea cambrici* Rivas-Mart. 1975 *nom. mut. propos.* (*mut.superfl.*)

pod02 Rivas-Martínez et al. (2001: 224 and 2011) used this mutated form, an action that might be considered an official proposal. (LM)

- *Anomodonto-Polypodietea serrati* Rivas-Mart. 1978 (2b)
- *Anogrammo-Polypodietea serrati* Rivas-Mart. 1982 (phantom)
- *Anomodonto-Polypodietea serrati* Rivas-Mart. in Rivas-Mart. et al. 1993 (syntax.syn.)

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GROUP OF ORDERS ON SILICEOUS SUBSTRATES

POD-01 *Hypno cupressiformi-Polypodietalia vulgaris* Jurko et Peciar ex Mucina et Theurillat 2015

Fern- and moss-rich chomophytic, chasmophytic and epiphytic vegetation of shaded rock faces and bark of old trees of cool-temperate Europe

- *Hypno-Polypodietalia* Jurko et Peciar 1963 (2b)
- *Hypno-Polypodietalia vulgaris* Jurko et Peciar ex S. Brullo et al. 2001 (5)

POD-01A *Hypno-Polypodion vulgaris* Mucina 1993

Fern-rich vegetation of siliceous shaded rock crevices in the colline and submontane belts of Central and Eastern Europe

POD-02 *Anomodonto-Polypodietalia serrati* O. de Bolòs et Vives in O. de Bolòs 1957

Mediterranean and Madeirean-Azorean fern- and moss-rich chomophytic and chasmophytic vegetation of shaded rock faces and epiphytic on branches of old trees

- *Anomodonto-Polypodietalia cambrici* O. de Bolòs et Vives in O. de Bolòs 1957 *nom. mut. propos.* (45)

pod03 See Remark *pod02*.

POD-02A *Polypodion serrati* Br.-Bl. in Br.-Bl. et al. 1952

Circum-mediterranean fern-rich epilithic communities of shaded rock faces and crevices and epiphytic on branches of old trees

- *Polypodion* Br.-Bl. 1931 (2b)
- *Polypodion cambrici* Br.-Bl. in Br.-Bl. et al. 1952 *nom. mut. propos.* (45)

pod04 Rivas-Martínez et al. (2002a: 273; see also Rivas-Martínez et al. 2011: 224) formally suggested this name change. (LM)

- *Bartramio-Polypodion serrati* O. de Bolòs et Vives in O. de Bolòs 1957 (syntax.syn.)
- *Polypodion serrati* Br.-Bl. in Br.-Bl. et al. 1957 (2b)
- *Asplenio-Sedion* Br.-Bl. 1966 (2b)

pod05 Although Braun-Blanquet (1966: 135) wrote of the 'Association *Selaginella denticulata et Grammitis leptophylla*' of Molinier (1937) he did not classify this association explicitly within the *Asplenio-Sedion*. Because no further validly described association was assigned to the *Asplenio-Sedion* in the protologue, this alliance name remains invalidly published. Brullo & Guarino (1999) typified the *Asplenio-Sedion* by selecting the *Selaginello-Anogrammetum leptophyllae* Molinier 1937 as the *holotypus.* However, the name *Asplenio-Sedion* remained invalid because the diagnostic species were not explicitly designated by Braun-Blanquet (1966). At this stage we do not consider the full validation of the *Asplenio-Sedion* as a priority since we concur with Brullo & Guarino (1999) and considered this syntaxon synonymous with the *Polypodion serrati*. (LM)

- *Anogrammion leptophyllae* Bellot et Casaseca in Bellot 1966 (syntax.syn.)
- *Gymnogrammion leptophyllae* Bellot et Casaseca in Bellot 1966 (29)
- *Anomodontion europaeum* O. de Bolòs et Masalles 1983 (34a)
- *Selaginello denticulatae-Anogrammion leptophyllae* Rivas-Mart. et al. 1999 (syntax.syn.)

POD-02B *Arenarion balearicae* O. de Bolòs et Molinier 1969

Chomophytic and chasmophytic herb-rich vegetation of shaded limestone rock faces and crevices of the Tyrrhenian Sea archipelago

- *Arenarion balearicae* O. de Bolòs et Molinier 1958 (3b)

POD-02C *Hymenophyllion tunbrigensis* Tx. in Tx. et Oberd. 1958

Sciophilous chomophytic and epiphytic fern-rich vegetation in humid and perhumid regions of the Atlantic coasts

pod06 The name '*Hymenophyllion tunbrigensis* Tüxen 1954' (*recte*: *Hymenophyllion tunbrigensis* Tx. in Tx. et Oberd. 1958) was validly published by Tüxen & Oberdorfer (1958: 245). However, in order to find the bibliographical reference to a validly published diagnosis of the 'Irish association *Hymenophylletum* Br.-Bl. 1950 of the region of Killarney' belonging to the alliance, one has to consider the description of the alliance in the context of the discussion on the association *Blechno-Quercetum roboris* on pages 238–244. The *Hymenophyllion* is explicitly mentioned as an appendix ('Anhang') of the latter. It is specifically indicated that the alliance *'Hymenophyllion'* is related to the *Dryopteris aemula* subassociation discussed on pages 241–243. On p. 243, Tüxen and Oberdorfer referred to page 385 in Braun-Blanquet & Tüxen (1952) to a transitional relevé of the *Blechno-Quercetum* not belonging to the subassociation, followed, on p. 386 with the valid publication of the '*Hymenophylletum* Br.-Bl. 1950' occurring in the region of Killarney (JPT, LM) KD suggests that this unit should be considered as representing a synusia in the *Pruno hixae-Lauretea*.

- *Hymenophyllion tunbrigensis* Tx.1954 (2b)

POD-02D *Thelipterido pozoi-Woodwardion radicantis* Fernández Prieto et Aguiar in Fernández Prieto et al. 2012

Madeirean-Azorean hyperoceanic fern-rich vegetation of rocky crevices and steep shaded loamy slopes

GROUP OF ORDERS ON CALCAREOUS SUBSTRATES

POD-03 *Ctenidio-Polypodietalia vulgaris* Jurko et Peciar ex Boşcaiu, Gergely et Codoreanu in Raţiu et al. 1966

Vegetation of shady calcareous rock faces and crevices at low altitudes of cool-temperate and submediterranean Europe

- *Ctenidio-Polypodietalia* Jurko et Peciar 1963 (2b)

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- *Ctenidio-Polypodietalia vulgaris* Jurko et Peciar ex S. Brullo et al. 2001 (31)

POD-03A *Ctenidio-Polypodion vulgaris* S. Brullo et al. 2001

Vegetation of shady calcareous rock faces and crevices of the Alps and the Carpathians

POD-03B *Moehringion muscosae* Horvat et Horvatić ex Boşcaiu, Gergely et Codoreanu in Raţiu et al. 1966

Vegetation of shady calcareous rock faces and crevices of southeastern Europe

- *Moehringion muscosae* Horvat et Horvatić 1962 (2b)
- *Asplenion lepidi* Lakušić 1970 (2b)

POD-03C *Polysticho setiferi-Phyllitidion scolopendrii* Ubaldi ex Ubaldi et Biondi in Biondi et al. 2014

Vegetation of shady calcareous rock faces and crevices of the Apennines

- *Polysticho setiferi-Phyllitidion scolopendrii* Ubaldi 2011 (2b)

POD-04 *Violo biflorae-Cystopteridetalia alpinae* Fernández Casas 1970

Vegetation of shady calcareous rock faces and crevices at high altitudes of cool-temperate Europe and in boreal-subarctic regions of the Arctic Ocean islands and Greenland

POD-04A *Violo biflorae-Cystopteridion alpinae* Fernández Casas 1970

Vegetation of shady calcareous rock faces and crevices at high altitudes of cool-temperate Western and Central Europe

- *Asplenion viridis* Gams 1936 (2d)
- *Cystopteridion* Richard 1972 (syntax.syn.)

POD-04B *Cochlearion alpinae* Br.-Bl. in Br.-Bl. 1952

Relict boreo-arctic vegetation of shady calcareous rock faces and crevices at low altitudes of the British Isles and Scandinavia

- *Asplenion viridis subarcticum* Nordhagen 1936 (phantom)
- *Asplenion viridis subarcticum* Nordhagen 1937 (2b)
- *Cochlearion alpinae* Br.-Bl. 1950 (phantom)

POD-05 *Petrocoptidetalia pyrenaicae* Rivas-Mart. et Cantó in Rivas-Mart. in al. 2002

Orocantabrian and Pre-Pyrenean calcareous chasmophytic vegetation of open cave floors and crevices of rock overhangs

- *Petrocoptidetalia pyrenaicae* Rivas-Mart. et al. 2001 (2b)

POD-05A *Valeriano longifoliae-Petrocoptidion* Fernández Casas 1972

Pre-Pyrenean submediterranean (sub)montane chasmophytic vegetation of cave openings and rock overhangs, and shady rock crevices

POD-05B *Rupicampanulion* Rothmaler 1954

Orocantabro-Bercian meso-supramediterranean chasmophytic vegetation of open cave floors and crevices of rock overhangs

pod07 The name '*Rupicampanulion*' was published in Rothmaler (1954: 599) with a bibliographical reference to two validly published associations, the *Rupicampanuletum cantabricum* Rothmaler 1941 and the *Saxifragetum trifurcatae* Rothmaler 1941, indicating the presence of two species of *Campanula* in both associations, namely *C. adsurgens* and *C. arvatica*. The name '*Petrocoptetum cantabricum*' is a *nomen nudum* in Rothmaler (1941: 119). The *Rupicampanulion* was considered to be a *nomen dubium* (Rivas-Martínez et al. 2011: 224), yet no reasoning for this suggestion was offered. (LM)

- *Petrocoptidion cantabricum* Fernández Casas 1972 (2b)
- *Petrocoptidion glaucifoliae* (P. Fernández et al. 1983) Rivas-Mart. et Izco in Rivas-Mart. et al. 2001 (2b)
- *Petrocoptidion glaucifoliae* (P. Fernández et al. 1983) Rivas-Mart., Cantó et Izco in Rivas-Mart. et al. 2002 (syntax.syn.)

ASP *Asplenietea trichomanis* (Br.-Bl. in Meier et Br.-Bl. 1934) Oberd. 1977

Chasmophytic vegetation of crevices, rocky ledges and faces of rocky cliffs and walls of Europe, North Africa, Middle East, the Arctic archipelagos and Greenland

asp01 The *Asplenietea trichomanis* is a particularly heterogeneous class. These rupicolous plant communities differ not only in species composition, alpha diversity and ecology, but also in overall structure, prevailing life form, and evolutionary history. Especially in the Mediterranean, the cliff habitats have served as refugia for plants to survive unfavourable climatic conditions as well as grazing pressure. There are a large number of plants exclusive to vertical rock, many of them being regional or local endemics. Researchers generally use different plot sizes when exploring plant communities dominated by hemicryptophytes or by nanophanerophytes. It seems therefore reasonable to assemble into one class only those plant communities of comparable plot size and life form. When applying these considerations as criteria to the *Asplenietea trichomanis,* the class would have to be split to accommodate herb-dominated rocky-fissure dwelling vegetation, and other assemblages dominated by shrubs and chamaephytes (commonly taxonomically isolated relicts such as in East Mediterranean cliffs). Various ecologically and phytogeographically segregated classes have been suggested to encompass 'nitrophilous' chasmophyte communities (*Cymbalario-Parietarietea*), communities of wet rocks (*Adiantetea*), communities of Iberian and North African overhanging rocks (*Petrocoptido pyrenaicae-Sarcocapnetea enneaphyllae*), epiphytic and rupicolous communities of Mediterranean oceanic conditions (*Polypodietea*), the Canarian *Greenovio-Aeonietea* and the Ibero-North African chasmophytic vegetation of the *Phagnalo-Rumicetea indurati*. This concept,

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however, seems unbalanced and does not satisfactorily structure the enormous range of rupicolous vegetation types. (EB, LM)

- *Asplenietales rupestres* Br.-Bl. in Meier et Br.-Bl. 1934 (orig.form) (11)
- *Asplenietea rutae-murariae* Oberd. et al. 1967 (phantom)
- *Asplenietea septentrionalis* Gams 1938 (phantom)
- *Minuartio-Saxifragetea* Lovrić et Rac 1989 (2b, 5)
- *Umbilico-Cheilanthetea* Lovrić in Lovrić et Rac 1991 (2b, 3c, 5)
- *Rupicapro-Cheilanthetea maderensis* Lacourt in Géhu 1992 (2b)
- *Umbilico-Cheilanthetea* Lovrić 1994 (2b)
- *Petrocoptido pyrenaicae-Sarcocapnetea enneaphyllae* Rivas-Mart. et al. 2001 (2b, 5)
- *Petrocoptido pyrenaicae-Sarcocapnetea enneaphyllae* Rivas-Mart. et al. 2002 (syntax.syn.)

ASP-01 *Geranio robertiani-Asplenietalia trichomanis* Ferrez ex Mucina *ined.*

Chasmophytic vegetation of semi-shaded and sunny rock faces and crevices in the lowland to submontane belts of temperate Europe

- *Geranio robertiani-Asplenietalia trichomanis* Ferrez 2010 (2b, 3b, 5)

ASP-01A *Asplenio scolopendrii-Geranion robertiani* Ferrez 2010

Chasmophytic vegetation of semi-shaded and sunny rock faces and crevices in the lowland to submontane belts of temperate Europe

- *Asplenio trichomanis-Ceterachion officinarum* Ferrez 2010 (syntax.syn.)

ASP-01B *Drabo cuspidatae-Campanulion tauricae* Ryff 2000

Chasmophytic vegetation of calcareous cliffs at mid-altitudes of the Crimean mountains

asp02 The position of this alliance within the *Geranio robertiani-Asplenietalia trichomanis* is problematic and subject to further enquiry. (LM)

- *Seselio gummiferae-Thymion callieri* Didukh in Vasylenko et Kuzmenenko 2009 (2b, 5)

ASP-02 *Potentilletalia caulescentis* Br.-Bl. in Br.-Bl. et Jenny 1926

Chasmophytic vegetation of sunny calcareous rock faces and crevices at high altitudes of the nemoral and boreal mountain ranges of Europe

asp03 This order at present encompasses 10 alliances and therefore, splitting this broadly conceived order into biogeographically more cohesive units is anticipated. In particular, the Iberian group of alliances could be considered for recognition as an order in its own right, with the rest of the alliances embedded within nemoral-boreal mountain ranges of Central and southeastern Europe would retain the name *Potentilletalia caulescentis*. (LM)

- *Potentilletalia* Br.-Bl. 1931 (2b)
- *Asplenietalia rutae-murariae* Oberd. et al. 1967 (29)
- *Artemisietalia petrosae* Sanda et al. 2001 (5)

ALPIC-CARPATHIAN GROUP OF ALLIANCES

ASP-02A *Potentillion caulescentis* Br.-Bl. in Br.-Bl. et Jenny 1926

Chasmophytic vegetation of calcareous rock faces and crevices in the subalpine and alpine belts of the Central and Eastern Alps and the Western Carpathians

- *Potentillion caulescentis* Br.-Bl. 1931 (2b)
- *Androsacion helveticae* Gams 1936 (2b)
- *Asplenion rutae-murariae* Gams 1936 (2b)
- *Caricion brachystachyos* Horvat 1962 (3b)

asp04 This concept was suggested by Horvat (1962: 65) as 'prov.', hence was invalidly published. Despite Horvat et al. (1974: 598) refraining from using preliminary status (prov.), they classified (also following Horvat 1962) within this alliance the invalidly described (ICPN art. 3b) '*Valeriana elongata-Aster bellidiastrum*-Ass.' (LM)

ASP-02B *Physoplexido comosae-Saxifragion petraeae* Mucina et Theurillat 2015

Chasmophytic vegetation of calcareous rock faces and crevices in the subalpine and alpine belts of the Southern Alps

- *Androsaco-Drabion tomentosae* Wraber 1970 (29)
- *Androsaci-Drabion tomentosae* T. Wraber 1979 (phantom)
- *Phyteumato-Saxifragion petraeae* Mucina in Šilc et Čarni 2012 (2b, 5)
- *Phyteumato-Saxifragion petraeae* Mucina in Mucina et al. 2011 (*sensu* Dakskobler et al. 2014) (phantom)
- *Phyteumato-Saxifragion petraeae* Mucina in Dakskobler et al. 2014 (2b, 5)

ASP-02C *Saxifragion lingulatae* (Rioux et Quézel 1949) Quézel 1950

Chasmophytic vegetation of calcareous rock faces and crevices at high altitudes of the Maritime Alps

ASP-02D *Micromerion pulegii* Boşcaiu (1971) 1979

Chasmophytic vegetation of calcareous rock faces and crevices in the montane and supramontane belts of the westernmost Southern Carpathians

- *Micromerion banaticum* Boşcaiu 1971 (34a)

ASP-02E *Gypsophilion petraeae* Borhidi et Pócs in Borhidi 1958

Chasmophytic vegetation of calcareous rock faces and crevices in the subalpine belt of the easternmost Southern and Eastern Carpathians

- *Gypsophilion petraeae* Borhidi et Pócs 1957 (phantom)
- *Asplenion rupestris* Borza et Boşcaiu 1965 (2b)

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IBERIAN GROUP OF ALLIANCES

ASP-02F *Saxifragion mediae* Br.-Bl. in Meier et Br.-Bl. 1934

Chasmophytic vegetation of calcareous rock faces and crevices in the montane to alpine belts of the Eastern Pyrenees

- *Saxifragion aizooni* Nègre 1968 (syntax.syn.)

ASP-02G *Sedo albi-Seslerion hispanicae* Br.-Bl. 1966

Chasmophytic vegetation on calcareous substrates in the alpine and subalpine belts of the Western Pyrenees and the Cantabrian Mountains

asp05 Rivas-Martínez et al. (1999: 376) placed this unit into synonymy with the *Cymbalario-Asplenion*, typified it with the *Crepido-Erinetum* Br.-Bl. 1966 (Braun-Blanquet 1966: 138, Tab. 2) and then suggested to reject it as a *nomen dubium* (ICPN art. 38). Rivas-Martínez et al. (2011: 213) repeated this suggestion and declared the *typus* they assigned in 1999 to be a *nomen dubium*. There is little reason to follow this suggestion since the original diagnoses of both the *Crepido-Erinetum* and the *Sedo albi-Seslerion hispanicae* are clear and meet all the requirements of the ICPN. As the only validly described association classified by Braun-Blanquet (1966: 138–140) is the '*Crepis albida-Erinus alpinus* Ass.', the latter association unit is automatically the *holotypus* of the alliance. The nomenclatural type *(lectotypus hoc loco)* of the *Crepido albidae-Erinetum alpinae* Br.-Bl. 1966 is relevé 1 in Table 2 in Braun-Blanquet (1966: 139). (LM)

- *Saxifragion trifurcato-canaliculatae* Rivas-Mart. 1969 (5)
- *Saxifragion trifurcato-canaliculatae* Rivas-Mart. in Rivas-Mart. et al. 1971 (syntax.syn.)

ASP-02H *Asplenio celtiberici-Saxifragion cuneatae* Rivas-Mart. in Loidi et Fernández Prieto 1986

Chasmophytic vegetation of calcareous rock faces and crevices in the meso- and supramediterranean belts of the Northern Iberian Peninsula

ASP-02I *Drabion hispanicae* Font Quer 1935

Chasmophytic vegetation of calcareous rock faces and crevices in the meso- and supramediterranean belts of the Eastern Iberian Peninsula

- *Drabeion hispanicae* Font Quer 1935 (orig.form)
- *Aspleniion glandulosae jasioniionosum glutinosae* Rivas Goday et al. 1954 (orig.form) (probably as suballiance) (3a)
- *Jasoniion glutinosae* Rivas Goday 1954 (orig.form) (2b, 3a)
- *Jasionion foliosae* O. de Bolòs 1957 (29)

ASP-02J *Saxifragion camposii* Cuatrecasas ex Quézel 1953

Chasmophytic vegetation of calcareous rock faces and crevices at high altitudes of the Sierra Nevada (Southern Iberian Peninsula)

- *Saxifragion camposii* Cuatrecasas 1929 (2b)
- *Saxifragion camposii* Cuatrecasas in Melchior et Cuatrecasas 1935 (2b)
- *Saxifragion campoi* Cuatrecasas ex Quézel 1953 (orig.form)
- *Drabion hispanicae sensu* Br.-Bl. in Meier et Br.-Bl. 1934, non Font Quer 1935 (pseudonym)
- *Drabion hispanicae sensu* Rivas Goday et al. 1954, non Font Quer 1935 (pseudonym)
- *Drabeion hispanicae* Br.-Bl. 1934 *var. iberica* Rivas Goday et al. 1954 (orig.form) (probably as suballiance) (2b, 3a)

ASP-02K *Saxifragion australis* Biondi et Ballelli ex S. Brullo 1984

Chasmophytic vegetation of calcareous rock faces and crevices in the subalpine and alpine belts of the Apennines

- *Saxifragion australis* Pedrotti in Pedrotti et Sanesi 1969 (2b)
- *Saxifragion australis* Biondi et Ballelli 1982 (5)
- *Saxifragion australis* Biondi et Ballelli ex S. Brullo 1983 (phantom)

DINARIC ALLIANCE

ASP-02L *Micromerion croaticae* Horvat in Blečić 1959

Chasmophytic vegetation of calcareous rock faces and crevices in the subalpine belt of the northwestern Dinarides

- *Micromerion croaticae* Horvat 1931 (3a)
- *Micromerion croaticae* Horvat 1937 (2b)
- *Micromerion croaticae* Horvat et al. 1974

ASP-03 *Moltkeetalia petraeae* Lakušić 1968

Chasmophytic vegetation of limestone crevices in the montane to alpine belts of the Central and Southern Dinarides

- *Moltkeetalia petraeae* Lakušić 1964 (phantom)
- *Amphoricarpetalia* Lakušić 1967 (phantom)
- *Amphoricarpetalia* Lakušić 1968 (syntax.syn.)

asp06 The syntaxonomic and phytogeographic relationship of the *Amphoricarpetalia* and *Potentilletalia speciosae* remains open to debate. (LM)

- *Moltkeetalia petraeae* Lakušić 1970 (31)
- *Minuartio-Drabetalia* Lovrić et Rac 1989 (2b, 5)

ASP-03A *Edraianthion* Lakušić 1968

Chasmophytic vegetation of limestone crevices in the montane and supramontane belts of the Central and Southern Dinarides

- *Edraianthion serpyllifolii* Lakušić 1983 (phantom)
- *Edraianthion glisicii* Lakušić 1984 (2b)
- *Edraianthion serpyllifolii* Lakušić 1984 (2b)
- *Edraianthion jugoslavici* Lakušić 1973 (phantom)
- *Edraianthion jugoslavici* Lakušić 1975 (2b)
- *Edraianthion jugoslavici* Lakušić 1984 (2b)
- *Edriantho-Minuartion capillaceae* Lovrić (1985) 1988 (orig.form) (*sensu* Lovrić & Rac 1989) (phantom)
- *Protoedraianthion tarae* Lakušić in Lakušić et Redžić 1988 (5)
- *Edriantho-Minuartion capillaceae* Lovrić et Rac 1989 (orig.form) (2b, 5)

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- *Edraianthion jugoslavici subalpinae calcicolum* D. Lakušić et V. Ranđelović 1996 (2b, 3b, 5)
- *Moltkaeion petraeae* Redžić 2000 (1)

ASP-03B *Amphoricarpion neumayeri* Lakušić 1968

Chasmophytic vegetation of limestone crevices in the subalpine and alpine belts of the Central and Southern Dinarides

asp07 Lakušić (1968) validly described three alliances from high altitudes of the southeastern Dinarides, differentiated at regional geographic scale, the *Amphoricarpion neumayeri*, the *Amphoricarpion bertiscei* and the *Amphoricarpion autariati*. We suggest that just one alliance would be sufficient to describe the variability of the calcareous crevice vegetation in this limited region and therefore select the *Amphoricarpion neumeyeri* to carry the name of this united syntaxonomic concept. (LM)

- *Amphoricarpion autariati* Lakušić 1967 (phantom)
- *Amphoricarpion bertiscei* Lakušić 1967 (phantom)
- *Amphoricarpion autariati* Lakušić 1968 (syntax.syn.)
- *Amphoricarpion bertiscei* Lakušić 1968 (syntax.syn.)
- *Amphoricarpion autariati* Lakušić 1970 (31)
- *Amphoricarpion bertiscei* Lakušić 1970 (31)
- *Amphoricarpion neumayeri* Lakušić et al. 1970 (31)
- *Amphoricarpion neumayeri* Lakušić et al. 1977 (31)
- *Edraianthion jugoslavici subalpinae serpentinicum* D. Lakušić et V. Ranđelović 1996 (2b, 3b, 5)

ASP-03C *Edraiantho graminifolii-Erysimion comati* Mucina et al. 1990

Chasmophytic vegetation of limestone crevices and rock faces and in the subalpine and alpine belts in the mountain ranges of the central-western regions of the Balkan Peninsula

- *Saxifragion coriophylleae* Lakušić et al. 1979 (phantom)

ASP-04 *Asplenietalia glandulosi* Br.-Bl. in Meier et Br.-Bl. 1934

Thermo-mesomediterranean chasmophytic vegetation of sunny calcareous rock faces and crevices of the Western Mediterranean

- *Asplenietalia petrarchae* Br.-Bl. in Meier et Br.-Bl. 1934 *nom. mut. propos.* (45)

asp08 Rivas-Martínez et al. (2002a: 249) formally suggested this name change. (LM)

- *Tinguarretalia siculae* Rigual et al. 1963 (29)
- *Phagnaletalia* Rigual et al. 1963 (2b)
- *Asplenietalia septentrionalis* Oberd. et al. 1967 (3a)
- *Arenario bertolonii-Phagnaletalia sordidae* Arrigoni et Di Tommaso 1991 (syntax.syn.)

GROUP OF CENTRAL MEDITERRANEAN ALLIANCES

ASP-04A *Asplenion glandulosi* Br.-Bl. in Meier et Br.-Bl. 1934

Thermo-mesomediterranean chasmophytic vegetation of limestone crevices of the northern Tyrrhenian seaboards

- *Asplenion glandulosi* Br.-Bl. 1931 (2b)
- *Asplenion petrarchae* Br.-Bl. in Meier et Br.-Bl. 1934 *nom. mut. propos.* (45)

asp09 Rivas-Martínez et al. (2002a: 249) formally suggested this name change. (LM)

ASP-04B *Brassicion insularis* Gamisans 1991

Thermo-mesomediterranean chasmophytic vegetation of limestone crevices of the Cyrno-Sardean Tyrrhenian coasts and Pantelleria

ASP-04C *Centaureo filiformis-Micromerion cordatae* Arrigoni et Di Tommaso 1991

Chasmophytic vegetation of calcareous rock crevices at high altitudes of Sardinia

ASP-04D *Arenarion bertolonii* Gamisans ex Theurillat in Mucina et al. 2015

Chasmophytic vegetation of calcareous rock crevices at high altitudes of Corsica

- *Arenarion bertolonii* Gamisans 1991 (8)

GROUP OF WESTERN MEDITERRANEAN ALLIANCES

ASP-04E *Brassico balearicae-Helichrysion rupestris* O. de Bolòs et Molinier 1958

Thermo-mesomediterranean chasmophytic vegetation of limestone crevices of the Balearic Islands

ASP-04F *Teucrion buxifolii* Rivas Goday 1956

Thermo-mesomediterranean chasmophytic vegetation of limestone crevices of the Eastern Iberian Peninsula

ASP-04G *Campanulion velutinae* Martínez-Parras et Peinado Lorca 1990

Thermo-mesomediterranean chasmophytic vegetation of limestone crevices of southernmost Spain and Northern Morocco

- *Campanulion mollis* Martínez-Parras et Peinado Lorca 1990 *nom. mut. propos.* (45)

asp10 Rivas-Martínez et al. (2002a: 252) formally suggested this name change. (LM)

- *Saxifragion boissiero-reuteranae* Asensi et Díez Garretas 1998

ASP-04H *Cosentinio bivalentis-Lafuenteion rotundifoliae* Asensi et al. 1990

Thermo-mesomediterranean chasmophytic vegetation of limestone crevices of semiarid regions of Southern Spain

- *Poterion ancistroidis* Br.-Bl. 1943 (orig.form) (*sensu* Molina Abril 1994: 87) (pseudonym)

asp11 The syntaxonomic concept of the *Poterion ancistroidis* Br.-Bl. in Meier et Br.-Bl. 1934, originally described for Moroccan mountains (Meier & Braun-Blanquet 1934) was wrongly applied to southern Spanish vegetation as suggested by Rivas-Martínez et al. (2011: 218; *Poterion ancistroidis auct. hisp. non* Br.-Bl. in Meier et Br.-Bl. 1934). This alliance does not occur in Europe. (LM)

- *Teucrion fragile* Nieto Caldera 1987 (1)

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ASP-05 *Centaureo dalmaticae-Campanuletalia pyramidalis* Trinajstić ex Terzi et Di Pietro 2016

Thermo-mesomediterranean chasmophytic vegetation of limestone cliffs of the Northern and Central Adriatic coastal regions

- *Centaureo-Campanuletalia* Trinajstić 1980 (3g)

asp12 Di Pietro & Wagensommer (2008) consider this name invalid because Trinajstić (1980) failed to list explicitly upon which species this name had been created (ICPN art. 3g). (LM, JPT)

- *Centaureo kartschiananae-Campanuletalia pyramidalis* Trinajstić ex Di Pietro et Wagensommer 2008 (5)

ASP-05A *Centaureo dalmaticae-Campanulion* Horvatić 1934

Thermo-mesomediterranean chasmophytic vegetation of limestone crevices of the Northern Adriatic seaboards

asp13 Di Pietro & Wagensommer (2008: 194) typified the name *Centaureo-Campanulion* by selecting the '*Campanulo-Centaureetum dalmaticae* Horvatić (1934) 1937' as the *typus*. This typification is both invalid and illegitimate. It is invalid because there is no unambiguous bibliographical reference to Horvatić (1937) in Di Pietro & Wagensommer's paper (ICPN art. 19a). Even if Di Pietro & Wagensommer (2008) had provided the required reference, the typification would have been illegitimate because the chosen type should have been the *Crithmo-Campanuletum dalmaticae* Horvatić 1934 and not the later superfluous name *Campanulo-Centaureetum dalmaticae* (ICPN art. 19a). Because the name *Centaureo-Campanulion* has still not been effectively typified, we choose here the *Crithmo-Centaureetum dalmaticae* Horvatić 1934 (protologue of which contains the alliance's name-giving taxon *Centaurea dalmatica*) as the *lectotypus (hoc loco)* of the alliance (Horvatić 1934: 192). (RDP, JPT, LM)

- *Aurinio-Capparion* Lovrić in Lovrić et Rac 1987 (2b, 5)

ASP-05B *Centaureo cuspidatae-Portenschlagiellion ramosissimae* Trinajstić ex Terzi et Di Pietro 2016

Thermo-mesomediterranean chasmophytic vegetation of limestone crevices of the Central and Southern Adriatic seaboards

- *Centaureo-Portenschlagiellion* Trinajstić 1980 (3f)

ASP-05C *Asperulion garganicae* Bianco et al. 1989

Thermo-mesomediterranean chasmophytic vegetation of limestone cliffs of the Monte Gargano (Italy)

- *Asperulion garganicae* Bianco et al. 1988 (phantom)

ASP-06 *Onosmetalia frutescentis* Quézel 1968

Thermo-mesomediterranean chasmophytic vegetation of limestone cliffs of the Southern Adriatic and Ionian seaboards

asp14 The question of the identity of this order as well as the floristically (and geographically) related *Centaureo-Campanuletalia* and *Asplenietalia glandulosi* was reviewed by Dimopoulos et al. (1997) and later analyzed by Terzi & D'Amico (2008). Yet these authors did not provide a syntaxonomic scheme for the thermo-mesomediterranean chasmophytic vegetation of the Adriatic and the Ionian seaboards. Di Pietro & Wagensommer's (2008: Tab. 5) demonstrated the strong floristic differences between the *Centaureo-Campanuletalia* (central and northern Adriatic seaboards) and *Onosmetalia* (southern Adriatic and Ionian seaboards). (RDP, LM)

- *Onosmetalia frutescentis* Quézel 1964 (2b)

ASP-06A *Campanulion versicoloris* Quézel 1964

Thermo-mesomediterranean chasmophytic vegetation of limestone rock crevices of the Hellenic Ionian coasts

- *Capparo-Putorion* Lovrić et Rac 1991 (2b)

ASP-06B *Caro multiflori-Aurinion megalocarpae* Terzi et D'Amico 2008

Thermo-mesomediterranean chasmophytic vegetation of limestone rock crevices of the southeastern Italian Adriatic and Ionian coasts

- *Campanulo versicoloris-Dianthion japigici* Di Pietro et Wagensommer 2008 (2b, 5)

ASP-07 *Cirsietalia chamaepeuces* Horvat in Horvat, Glavač et Ellenberg ex Bergmeier et al. 2011

Chasmophytic vegetation of calcareous cliffs at low and mid-altitudes of the Aegean region

- *Cirsietalia chamaepeuces* Horvat in Horvat et al. 1974 (3b)
- *Ptilostemonetalia chamaepeuces* Horvat in Horvat et al. 1974 *nom. mut. propos.* (2b, *mut.illeg.*)

asp15 Lovrić & Rac (1989) presented an informal proposal towards this end. This proposal is superfluous since the name is invalid. (LM)

- *Petromaruletalia pinnati* Zaffran 1990 (5)
- *Ptilostemonetalia chamaepeuces* Horvat in Horvat, Glavač et Ellenberg ex Bergmeier et al. 2011 *nom. mut. propos.* (45)

ASP-07A *Petromarulo-Centaurion argenteae* Horvat in Horvat, Glavač et Ellenberg ex Bergmeier et al. 2011

Chasmophytic vegetation of calcareous cliffs at low and mid-altitudes of Western Crete

- *Petromarulo-Centaurion argenteae* Horvat in Horvat et al. 1974 (3b)
- *Scutellarion sieberi* Zaffran 1990 (5)

ASP-07B *Asterion cretici* Zaffran ex Bergmeier et al. 2011

Chasmophytic vegetation of calcareous cliffs at low and mid-altitudes of Eastern Crete

- *Asterion cretici* Zaffran 1990 (5)

ASP-07C *Capparo-Amaracion tournefortii* Horvat in Horvat, Glavač et Ellenberg ex Bergmeier et al. 2011

Chasmophytic vegetation of calcareous cliffs of the Northern and Central Aegean regions

- *Capparo-Amaracion* Horvat in Horvat et al. 1974 (3b)

ASP-07D *Inulion heterolepidis* Horvat ex Bergmeier et al. 2011

Chasmophytic vegetation of calcareous cliffs of the Dodecanese and Karpathos of the southeastern Aegean region

- *Inulion heterolepidis* Horvat in Horvat et al. 1974 (3b)

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ASP-08 *Sarcocapnetalia enneaphyllae* Fernández Casas 1972

Calcicolous chasmophytic vegetation of open cave floors and rock overhangs of the mediterranean Iberian Peninsula

- *Coeno-Sarcocapnetalia* Deil et Galán de Mera 1996 (3d)

ASP-08A *Sarcocapnion enneaphyllae* Fernández Casas 1972

Calcicolous chasmophytic vegetation of open cave floors and rock overhangs of the central and eastern regions of the Iberian Peninsula

- *Coeno-Sarcocapnion* Deil et Galán de Mera 1996 (3d)

ASP-08B *Sarcocapnion pulcherrimae* Fernández Casas 1972 *corr.* Rivas-Mart. et al. 2001

Calcicolous chasmophytic vegetation of open cave floors and rock overhangs of the Southern Iberian Peninsula

asp16 For the formal correction see Rivas-Martínez et al. (2001: 60). (LM)

- *Sarcocapnion crassifoliae* Fernández Casas 1972 (43)
- *Sarcocapnion pulcherrimae* Fernández Casas 1972 *corr.* Rivas-Mart. et al. 2002 (*corr.superfl.*)

ASP-09 *Potentilletalia speciosae* Quézel 1964

Chasmophytic vegetation of calcareous rocky crevices of the high mountain ranges of the Southern Balkans and the Aegean region

- *Campanuletalia jacquinii* Zaffran 1990 (3e, 5)

ASP-09A *Galion degenii* Quézel 1967

Chasmophytic vegetation of calcareous rocky crevices of the Pindos (Hellas)

ASP-09B *Ramondion nathaliae* Horvat ex Simon 1958

Chasmophytic vegetation of calcareous rocky crevices in the alpine belt of the southern and central regions of the Balkans

- *Ramondion nathaliae* Horvat 1937 (2b)

ASP-09C *Saxifragion scardicae* Dimopoulos et al. 1997

Chasmophytic vegetation of calcareous rocky crevices of Mt Olympos (Hellas)

ASP-09D *Silenion auriculatae* Quézel 1964

Chasmophytic vegetation of calcareous rocky crevices of the southern regions of the Hellenic mainland and the Peloponnisos

ASP-09E *Arenarion creticae* Dimopoulos et al. ex Bergmeier 2002

Chasmophytic vegetation of calcareous rocky crevices in the oromediterranean belt of Crete

- *Diosphaerion jacquinii* Zaffran 1982 (1)
- *Campanulion jacquinii* Zaffran 1990 (3e, 5)
- *Arenarion creticae* Dimopoulos et al. 1997 (2b, 3b)

TEMPERATE GROUP OF ORDERS ON SILICEOUS SUBSTRATES

ASP-10 *Asplenietalia septentrionalo-cuneifolii* Mucina et Theurillat 2015

Chasmophytic vegetation of siliceous and ultramafic rock crevices at low altitudes of temperate and boreal Europe

ASP-10A *Asplenion marini* Segal 1969

Fern-rich chasmophytic vegetation of siliceous rock crevices in supralittoral habitats of the Cantabro-Atlantic coasts

asp17 Rivas-Martínez et al. (2011: 215) prefer to classify this alliance within the *'Parietarietalia'*. (LM)

- *Asplenio billotii-Umbilicion rupestris* de Foucault 1988 (syntax.syn.)
- *Asplenion marini* Rivas-Mart. et Izco in Rivas-Mart. et al. 2002 (31)

ASP-10B *Asplenion septentrionalis* Gams ex Oberd. 1938

Fern-rich chasmophytic vegetation of siliceous sunny rock crevices and boulder fields of temperate and boreal Europe

- *Asplenion septentrionalis* Gams 1927 (2b)
- *Asplenion septentrionalis* Gams 1929 (2b)
- *Androsacion septentrionalis* Gams 1940 (2b)
- *Asplenion septentrionalis* Focquet 1982 (5)

ASP-10C *Asplenion serpentini* Br.-Bl. et Tx. ex Eggler 1955

Fern-rich chasmophytic vegetation of ultramafic rock crevices of Central Europe

- *Asplenion serpentini* Br.-Bl. et Tx. 1943 (2b)
- *Asplenion cuneifolii* Br.-Bl. et Tx. ex Eggler 1955 *nom. mut. propos.* (45)

asp18 Chytrý (2009: 417) formally suggested this name mutation. (LM)

ASP-10D *Pohlio crudae-Asplenion septentrionalis* S. Brullo et Siracusa in S. Brullo et al. 2002

Fern-rich chasmophytic vegetation of siliceous rock crevices in the supramediterranean belt of Sicily and Calabria

ASP-10E *Thalictro foetidi-Asplenion* Onipchenko et Gorbachevskaya in Onipchenko 2002 (Biul. Mosk. Obshch. Ispyt. Prir., Otd. Biol.)

Fern-rich chasmophytic vegetation of siliceous rock crevices in the montane zone of the Caucasus

- *Thalictro foetidi-Asplenion* Onipchenko et Gorbachevskaya in Onipchenko 2002 (Veröff. Geobot. Inst. ETH Zürich) (5)

ASP-11 *Androsacetalia vandellii* Br.-Bl. in Meier et Br.-Bl. 1934 *nom. corr.*

Chasmophytic vegetation of crevices of siliceous rocks in the mountains in the nemoral, boreal and arctic zones of Europe

asp19 For the motivation of the correction of the syntaxon name see Weber et al. (2000: ICPN art. 44, Example 2). (JPT)

- *Androsacetalia multiflorae* Br.-Bl. 1931 (2b)
- *Androsacetalia multiflorae* Br.-Bl. in Meier et Br.-Bl. 1934 (44)
- *Androsacetalia argenteae* Br.-Bl. in Meier et Br.-Bl. 1934 *nom. mut. propos.* (45)
- *Asplenietalia septentrionalis* Lakušić 1968 (2b)
- *Asplenietalia septentrionalis* Loisel 1970 (29a)

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- *Androsacetalia vandellii* Br.-Bl. in Meier et Br.-Bl. 1934 *corr*. Rivas-Mart. et al. 2002 (*corr.superfl.*)

BOREO-ARCTIC GROUP OF ALLIANCES

ASP-11A *Saxifragion cotyledonis* Nordhagen ex Mucina et Chytrý *all. nov. hoc loco*

Chasmophytic vegetation of crevices and on ledges of siliceous rocks of Scandinavia, the Arctic Ocean archipelagos and Greenland

asp20 The *Saxifragion cotyledonis subarticum* (Nordhagen 1937; see also Nordhagen 1943) contained only sociations in the protologue. The *Saxifragion cotyledonis* remained invalidly published until Dierssen (1982: 193) described the *Rhodiolo roseae-Saxifragetum cotyledonis*, and assigned one of the relevés published by Nordhagen (1943: Tab. 98, rel. 6) as '*lectotypus*' (*recte: holotypus*) of his new association. Yet Dierssen (1982) has not recognized the *Saxifragion cotyledonis* as an alliance in its own right. Instead, he assigned the *Rhodiolo roseae-Saxifragetum cotyledonis* to the *Androsacion vandellii*. We suggest that the latter alliance (typical of siliceous crevices of the mountains of the nemoral zone) has floristically not much in common with the *Saxifragion cotyledonis* (typical for the boreal to subarctic zones). Here we assign the *Rhodiolo roseae-Saxifragetum cotyledonis* Dierssen 1982 as the *holotypus (hoc loco)* of the *Saxifragion cotyledonis*. The diagnostic species of the validated alliance are: *Saxifraga cotyledon, S. nivalis* and *Woodsia alpina*. (LM, MC)

- *Saxifragion cotyledonis subarcticum* Nordhagen 1936 (phantom)
- *Saxifragion cotyledonis subarcticum* Nordhagen 1937 (2b)
- *Saxifragion cotyledonis* Nordhagen 1943 (2b)

ASP-11B *Allosuro-Athyrion alpestris* Nordhagen 1943

Boreo-alpine and arctic vegetation on siliceous boulder fields of Scandinavia, Svalbard and Greenland

- *Allosuro-Athyrion alpestris* Nordhagen 1936 (phantom)
- *Allosuro-Athyrion alpestris* Nordhagen 1937 (2b)
- *Cryptogrammo-Athyrion alpestris* Nordhagen 1936 *nom. mut. propos.* (*mut.superfl.*)
- *Cryptogrammo-Athyrion distentifolii* Nordhagen 1943 *nom. mut. propos.* (45)
- *Cryptogrammo-Athyrion alpestris* Gjaerevoll 1949 (2b)
- *Cryptogrammo-Athyrion alpestris* Gjaerevoll 1950 (29)

TEMPERATE-ALPINE GROUP OF ALLIANCES

ASP-11C *Androsacion vandellii* Br.-Bl. in Br.-Bl. et Jenny 1926 *nom. corr.*

Chasmophytic vegetation of siliceous rock crevices and on ledges in the alpine and nival belts of the Central European mountains

- *Androsacion multiflorae* Br.-Bl. in Br.-Bl. et Jenny 1926 (44)
- *Saxifragion bryoidis* Nègre 1968 (syntax.syn.)
- *Androsacion vandellii* Br.-Bl. in Br.-Bl. et Jenny 1926 *corr*. Rivas-Mart. et al. 2002 (*corr.superfl.*)

ASP-11D *Saxifragion pedemontanae* Barbero et Bono 1967

Chasmophytic vegetation of siliceous rock crevices at high altitudes of the Maritime Alps

ASP-11E *Saxifragion cymosae* Lakušić 1970

Chasmophytic vegetation of siliceous rock crevices at high altitudes of the Western Balkans

ASP-11F *Silenion lerchenfeldianae* Simon 1958

Chasmophytic vegetation of siliceous rock crevices at high altitudes of the Eastern Carpathians and the Southern Balkans

- *Silenion lerchenfeldianae* Horvat 1937 (2b)
- *Silenion lerchenfeldianae* Simon 1957 (phantom)

ASP-11G *Gypsophilion tenuifoliae* Onipchenko 2002

Chasmophytic vegetation of siliceous rock crevices in the subalpine to subnival belts of the Caucasus

OROMEDITERRANEAN GROUP OF ALLIANCES

ASP-11H *Hieracion carpetani* González-Albo 1941

Chasmophytic vegetation of siliceous rock crevices at high altitudes of the Central and Northern Iberian Peninsula

asp22 González Albo (1941) described validly the *Hieracion carpetani* as well as the *Hieracietum carpetani* (this association automatically becomes the *holotypus* of the *Hieracion carpetani*). Rivas-Martínez et al. (2011: 215) ignored the *Hieracietum carpetani* in their otherwise exhaustive account of associations, and placed the *Hieracion carpetani* (invoking ICPN art. 38) into synonymy with the *Saxifragion willkommianae*. Due to a lack of appropriate arguments required to prove the name *Hieracion carpetani* invalid or illegitimate, the latter name remains the valid name for this syntaxonomic concept until proven otherwise. (LM)

- *Saxifragion willkommianae* Rivas-Mart. 1964 (syntax.syn.)
- *Saxifragion caballeroi* Rivas-Mart. 1964 *corr*. Rivas-Mart. et C. Sáenz 1986 (40, *mut.illeg.*)

ASP-11I *Saxifragion nevadensis* Rivas Goday et Rivas-Mart. 1971

Chasmophytic vegetation of siliceous rock crevices at high altitudes of the Sierra Nevada (Southern Iberian Peninsula)

ASP-11J *Potentillion crassinerviae* Gamisans 1975

Chasmophytic vegetation of siliceous rock crevices in the supra- to oromediterranean belts of Corsica and Sardinia

- *Potentillion crassinerviae* Gamisans 1968 (phantom)

MEDITERRANEAN GROUP OF ORDERS ON SILICEOUS SUBSTRATES

ASP-12 *Asplenietalia lanceolato-obovati* (Loisel 1970) Theurillat et Mucina in Mucina et Theurillat 2015

Central and Western Mediterranean and submediterranean chasmophytic vegetation of siliceous rock crevices at low altitudes

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ASP-12A *Antirrhinion asarinae* (Br.-Bl. in Meier et Br.-Bl. 1934) Br.-Bl. in Br.-Bl. et al. 1952

Chasmophytic vegetation of siliceous rock crevices and screes in the colline and submontane belts of the Massif Central

asp23 Rivas-Martínez et al. (2011: 215) prefer to classify this alliance within the *Androsacetalia vandellii*. (LM)

- *Antirrhinion asarinae* Br.-Bl. 1931 (2b)
- *Asarinion rupestris* Br.-Bl. in Meier et Br.-Bl. 1934 (34a)
- *Asarinion procumbentis* (Br.-Bl. in Meier et Br.-Bl. 1934) Br.-Bl. in Br.-Bl. et al. 1952 *nom. mut. propos.* (45)
- *Dianthion gratianopolitani* Focquet 1982 (5)

ASP-12B *Cheilanthion hispanicae* Rivas Goday et al. 1956

Chasmophytic vegetation of siliceous rock crevices in the meso- and supramediterranean belts of the Western Iberian Peninsula

- *Cheilanthion hispanicae* Rivas Goday 1955 (phantom)

ASP-12C *Asplenio billotii-Dianthion godroniani* Rameau in Bensettiti et al. 2004 *nom. inval.* (2b)

Supramediterranean chasmophytic vegetation of siliceous rock crevices of Corsica

- *Asplenio billotii-Dianthion sylvestris var. godroniani* Rameau in Bardat et al. 2004 (orig.form) (2b)

ASP-12D *Linarion caprariae* Foggi et al. 2006

Thermo-mesomediterranean chasmophytic vegetation of siliceous rock crevices of the Tuscan Archipelago

ASP-12E *Dianthion rupicolae* S. Brullo et Marcenò 1979

Thermo-mesomediterranean chasmophytic vegetation of siliceous rock crevices of the Siculo-Calabrian Tyrrhenian coasts

- *Centaureion pentadactyli* S. Brullo et al. 2001 (syntax.syn.)

ASP-13 *Cheilanthetalia maranto-maderensis* Sáenz de Rivas et Rivas-Mart. 1979

Mediterranean and Macaronesian thermophilous fern-rich chasmophytic vegetation of siliceous and ultramafic rock crevices

- *Asplenietalia maranto-maderensis* Sáenz de Rivas et Rivas-Mart. 1979 (phantom)
- *Notholaeno marantae-Cheilanthetalia maderensis* Sáenz de Rivas et Rivas-Mart. 1979 *nom. mut. propos.* (45)

asp24 The formal proposal to mutate the name was presented by Rivas-Martínez et al. (2011: 218, 478). (LM)

ASP-13A *Cheilanthion pulchellae* Sáenz de Rivas et Rivas-Mart. 1979

Macaronesian fern-rich chasmophytic vegetation of ultramafic rock crevices of the arid regions in the infra- and mesomediterranean belts

ASP-13B *Phagnalo saxatilis-Cheilanthion maderensis* Loisel 1970 *corr.* Pérez-Carro et al. 1989

Iberian fern-rich chasmophytic vegetation of ultramafic rock crevices in subhumid to humid regions in the infra- and supramediterranean belts

asp25 The name *Phagnalo saxatilis-Cheilanthion fragrantis* (Loisel 1970) was based on *Cheilanthes fragrans*, which appeared to be a misidentification for *Cheilanthes maderensis* (see Pérez Carro et al. 1989). (LM)

- *Asplenion cuneifolii mediterraneum* P. da Silva 1970 (3b)
- *Phagnalo saxatilis-Cheilanthion fragrantis* Loisel 1970 (43)
- *Asplenio obovati-Cheilanthion maderensis* (Loisel 1970) Sáenz et Rivas.-Mart. 1979 (29a)

ASP-13C *Polygonion icarici* Horvat in Horvat, Glavač et Ellenberg ex Bergmeier et al. 2011

Thermomediterranean chasmophytic vegetation of sunny siliceous rock crevices of the southern islands of the Aegean archipelago

asp26 The classification of this alliance within the *Cheilanthetalia* is only tentative, pending more data and syntaxonomic analyses of the rock-crevice vegetation on siliceous substrates from the Central and Eastern Mediterranean. (LM, EB)

- *Polygonion icarici* Horvat in Horvat et al. 1974 (3b)

CYM *Cymbalario-Parietarietea diffusae* Oberd. 1969

Thermophilous chasmophytic vegetation of walls of the Mediterranean and the winter-mild atlantic to subcontinental regions of temperate Europe, Middle East and North Africa

cym01 The wall vegetation of the Mediterranean and winter-mild regions of Western and Central Europe has sometimes been placed within a class in its own right, '*Parietarietea*' or '*Cymbalario-Parietarietea*' (see Rivas-Martínez 1978a; Brullo & Guarino 1999, 2002 for the key syntaxonomic studies). Other authors (e.g. Mucina 1993a) prefer classification of this syntaxonomic content within the *Asplenietea trichomanis*. (LM)

- *Parietarietea rupestris* Rivas-Mart. in Rivas Goday 1956 (pro subclass) (2b, 3b)

cym02 The name '*Parietarietea rupestris*' in Rivas Goday et al. (1956) refers to a (provisional) subclass and therefore it is not a subject of this conspectus. (JPT)

- *Parietarietea mauritanicae* Rivas-Mart. ex Rivas Goday 1964 (2b)
- *Cymbalario muralis-Parietarietea diffusae* Oberd. in Oberd. et al. 1967 (2b)
- *Cymbalario-Parietarietea judaicae* Oberd. 1969 *nom. mut. propos.* (45)

cym03 Láníková & Sádlo in Chytrý (2009: 441) formally suggested this name mutation. (LM)

- *Parietarietea judaicae* Oberd. 1977 (phantom)
- *Parietarietea muralia* Rivas-Mart. ex Izco et al. 1977 (34a)

CYM-01 *Tortulo-Cymbalarietalia* Segal 1969

Thermophilous chasmophytic vegetation of walls of the Mediterranean and the winter-mild atlantic to subcontinental regions of temperate Europe, Middle East and North Africa

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- *Parietarietalia* Rivas-Mart. in Rivas Goday 1956 (2b)
- *Parietarietalia muralis* Rivas-Mart. 1960 (2b)
- *Parietarietalia* Rivas Goday 1964 (2b)
- *Parietarietalia mauritanicae* Rivas-Mart. ex Rivas Goday 1964 (2b)
- *Parietarietalia muralis* Rivas-Mart. ex Br.-Bl. 1966 (phantom)
- *Parietarietalia muralis* Rivas-Mart. 1969 (34a)
- *Parietarietalia muralis* Rivas-Mart. ex Oberd. 1969 (34a)
- *Parietarietalia judaicae* (Rivas-Mart. ex Rivas Goday 1964) Oberd. 1977 (29)
- *Parietarietalia* (Rivas-Mart. 1960) Rivas Goday ex Rivas-Mart. et al. 2011 (2b)

cym04 As name '*Parietarietalia muralis* Rivas-Martínez 1960' being invalidly published (ICPN art. 2b), the name '*Parietarietalia*' in Rivas Goday (1964) consequently cannot be considered a *nomen novum*. with the correct citation of the name being *Parietarietalia* Rivas-Mart. ex Rivas Goday 1964. (JPT)

- *Capparidetalia spinosae* Biondi, Blasi et Galdenzi in Biondi et al. 2014 (syntax.syn.)

TEMPERATE ALLIANCE

CYM-01A *Cymbalario-Asplenion* Segal 1969

Fern-rich chasmophytic vegetation of sunny walls of the atlantic to subcontinental regions of cool-temperate Europe

- *Linarion cymbalariae* Segal 1961 (2b)
- *Tortulo-Linarion cymbalariae* Westhoff 1966 (1)
- *Cymbalario muralis-Asplenion quadrivalentis* Segal 1969 *corr*. Rivas-Mart. et al. 2011 (10c, 40)
- *Asplenio billotii-Cymbalarion muralis* de Foucault 2014 (syntax.syn.)

MEDITERRANEAN GROUP OF ALLIANCES

CYM-01B *Galio valantiae-Parietarion judaicae* Rivas-Mart. ex O. de Bolòs 1967

Thermomediterranean chasmophytic vegetation of limestone walls of the Iberian Peninsula and the Western Tyrrhenian archipelago

- *Parietario-Galion murale* Rivas-Mart.1955 (orig.form) (2b, 34a)
- *Parietario-Centranthion rubri* Rivas-Mart. 1960 (2b)
- *Parietario-Galion* Rivas-Mart. 1960 (2b)
- *Centrantho rubri-Parietarion* Rivas-Mart. 1960 *nom. invers. propos.* (*invers.superfl.*)
- *Parietario-Galion muralis* Rivas-Mart. ex Rivas Goday 1964 (2b)
- *Linario-Parietarion diffusae* Br.-Bl. 1964 (2b)
- *Parietario-Galion* Rivas-Mart. ex Br.-Bl. 1966 (3f)
- *Galio lucidi-Parietarion diffusae* Rivas-Mart. ex Oberd. 1969 (syntax.syn.)
- *Galio-Parietarion mauritanicae* Rivas-Mart. 1969 (3f)

cym05 In Rivas-Martínez (1969: 10), the name '*Galio-Parietarion mauritanicae* Rivas-Mart. 1960' is to be found with the (invalidly published) name '*Parietario-Galion murale* Rivas-Mart. 1960' indicated in the synonymy. Therefore, the name '*Galio-Parietarion mauritanicae*' can be considered as an incidental validation of the name published in 1960. However, the name in 1969 is also invalidly published because no species of *Parietaria* occurs in the unique association ('As. *Oryzopsi-Anthirrinetum granitici australe* Rivas-God. 1960') indicated in the diagnosis of the alliance. (JPT)

- *Parietario-Centranthion rubri* Rivas-Mart. 1969 (syntax. syn.)
- *Parietarion judaicae* Segal 1969 (syntax.syn.)

CYM-01C *Artemisio arborescentis-Capparidion spinosae* Biondi, Blasi et Galdenzi in Biondi et al. 2014

Thermomediterranean chasmophytic vegetation of limestone walls of the Apennine Peninsula, Corsica, Sardinia, Sicily and Malta

CYM-01D *Parietario judaicae-Hyoscyamion aurei* S. Brullo et Guarino 1999

Thermomediterranean chasmophytic vegetation of limestone walls of the Eastern Mediterranean

THL *Thlaspietea rotundifolii* Br.-Bl. 1948

Vegetation of scree habitats and pebble alluvia of the temperate, boreal and oromediterranean Europe and the Arctic archipelagos

- *Violetea calaminariae* Br.-Bl. et Tx. 1943 (2b)
- *Seslerio-Arabidetea alpinae* Hadač et Klika in Klika et Hadač 1944 (3f)
- *Myricario-Thlaspeetea rot.* Oberd. 1949 (orig.form) (2b)
- *Epilobio-Thlaspietea* Moor 1958 (29)
- *Violetea calaminariae* Tx. in Lohmeyer et al. 1962 (2b)
- *Violetea calaminariae* Br.-Bl. et Tx. ex Ernst 1965 (syntax.syn.)

thl01 The concept of the *Violetea calaminariae* still survives in some regional vegetation surveys (e.g. Bardat et al. 2004). (LM)

- *Galeopsietea ladani* O. de Bolòs 1968 (phantom)

thl02 The name '*Galeopsietea ladani*' is not mentioned in de Bolòs (1968). Instead, a *divisio* (syntaxonomic rank not recognized by the ICPN) '*Galeopsiea (ladani)*' was suggested (p. 6) that seemingly later has been mistaken for a 'class'. (LM)

- *Epilobietea dodonaei-fleischeri* Lacourt in Géhu 1992 (2b)
- *Galeopsio-Achnatheretea calamagrostis* Lacourt in Géhu 1992 (2b)

GROUP OF ORDERS OF CALCAREOUS SUBSTRATES

THL-01 *Thlaspietalia rotundifolii* Br.-Bl. in Br.-Bl. et Jenny 1926

Alpine and subalpine calcareous scree vegetation of Europe and Greenland

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- *Thlaspietalia* Br.-Bl. 1931 (2b)
- *Thlaspietalia stylosi* Avena et Bruno 1975 (2b)

ALPIC-CARPATHIAN GROUP OF ALLIANCES

THL-01A *Thlaspion rotundifolii* Jenny-Lips 1930

Alpine and subalpine vegetation of calcareous scree vegetation of the Alps

- *Thlaspion rotundifolii* Br.-Bl. in Br.-Bl. et Jenny 1926 (2b)
- *Trisetion distichophylli* Gams 1936 (2b)
- *Galio anisophylli-Minuartion vernae* Ernst 1964 (1)
- *Galio anisophylli-Minuartion vernae* Ernst 1965 (syntax. syn.)

THL-01B *Papaverion tatrici* Pawłowski et al. 1928 *corr.* Valachovič 1995

Alpine and subalpine vegetation of calcareous scree vegetation of the Western Carpathians

- *Papaverion burseri* Pawłowski et al. 1928 (43)

THL-01C *Papavero-Thymion pulcherrimi* Pop 1968

Alpine calcareous scree vegetation of the Eastern and Southern Carpathians

PYRENNEAN-IBERIAN GROUP OF ALLIANCES

THL-01D *Iberidion spathulatae* Br.-Bl. 1948

Pyrenean oro-cryotemperate calcareous scree vegetation

THL-01E *Linarion filicaulis* Rivas.-Mart. ex Fernández Prieto 1983

Orocantabrian and Castilian-Cantabrian montane calcareous scree vegetation

- *Linarion filicaulis* Rivas-Mart. 1969 (3b)
- *Iberido apertae-Linarion propinquae* Penas et al. ex Díaz González et Fernández Prieto 1994 (syntax.syn.)

THL-01F *Saxifragion praetermissae* Rivas-Mart. 1977

Orocantabrian and Pyrennean vegetation of wet screes with long-lasting snow cover

THL-01G *Platycapno saxicolae-Iberidion granatensis* Rivas Goday et Rivas-Mart. 1963

Southern Iberian supra-oromediterranean calcareous scree vegetation

- *Platycapno saxicolae-Iberidion lagascanae* Rivas Goday et Rivas-Mart. 1963 *nom. mut. propos.* (45)

thl03 Rivas-Martínez et al. (2002a: 272) formally suggested this name change. (LM)

GROUP OF APENNINE ALLIANCES

THL-01H *Festucion dimorphae* Bonin 1978

Vegetation of lower montane to subalpine calcareous screes of the Central and Southern Apennines

- *Festucion dimorphae* Lakušić 1968 (phantom)
- *Festucion dimorphae* Barbero et Bonin 1969 (2b)
- *Festucion dimorphae* Lakušić 1969 (2b)
- *Linario-Festucion dimorphae* Avena et Bruno 1975 (2b)
- *Linario-Festucion dimorphae* Avena et Bruno ex Feoli-Chiapella 1983 (syntax.syn.)
- *Aquilegion bertolonii* (Tomaselli 1994) Biondi et Allegrezza in Biondi et al. 2014 (syntax.syn.)

THL-01I *Thlaspion stylosi* Feoli-Chiapella et Feoli 1977

Vegetation of alpine calcareous screes of the Central and Southern Apennines

- *Thlaspion apenninicum* Migliaccio 1970 (34a)
- *Thlaspion stylosi* Feoli-Chiapella 1983 (31)
- *Crepido breviscapi-Violion magellensis* Ubaldi 2011 (*sensu* Biondi et al. 2014) (phantom)
- *Isatidion allionii* Ubaldi 2011 (syntax.syn.)
- *Leontodonto breviscapi-Violion magellensis* Ubaldi 2011 (syntax.syn.)
- *Violo magellensis-Cerastion thomasii* Biondi, Blasi et Allegrezza in Biondi et al. 2014 (syntax.syn.)

BALKAN GROUP OF ALLIANCES

THL-01J *Saxifragion prenjae* Lakušić 1968

Subalpine chionophilous calcareous scree communities of the Southern and Central Dinarides

- *Saxifragion prenjae* Lakušić 1966 (phantom)
- *Saxifragion prenjae* Lakušić 1970 (31)

THL-01K *Bunion alpini* Lakušić 1968

Subalpine chionophilous calcareous scree communities of the Northern Dinarides

- *Bunion alpini* Lakušić 1970 (31)

THL-01L *Veronico-Papaverion degenii* Mucina et al. 1990

Alpine communities on marble and limestone screes of the Pirin Mountains (Bulgaria)

BOREO-ARCTIC ALLIANCE

THL-01M *Arenarion norvegicae* Nordhagen 1935

Vegetation of base-rich and neutral screes and moraines of Scandinavia and Greenland

- *Arenarion norvegicae* Nordhagen 1936 (phantom)
- *Arenarion norvegicae* Nordhagen 1937 (2b)

THL-02 *Arabidetalia caeruleae* Rübel ex Nordhagen 1937

Vegetation of snow-beds on stabilized calcareous screes of the arctic zone and the alpine and subnival belts of European mountains

thl04 The name '*Arabidetalia caeruleae*, Rübel' was validly published by Nordhagen (1937: 44), who included in this order, besides the *Luzulion nivalis (nomen nudum)*, the '*Arabidion caeruleae*' by using a direct bibliographic reference to Braun-Blanquet & Jenny (1926), unambiguously cited in the bibliography. Therefore, the correct citation of the name should read *Arabidetalia caeruleae* Rübel ex Nordhagen 1937. (JPT)

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- *Arabidetalia caeruleae* Rübel 1933 (2b)
- *Arabidetalia caeruleae* Nordhagen 1936 (phantom)
- *Arabidetalia caeruleae* Rübel ex Br.-Bl. 1949 (31)
- *Salicetalia retuso-serpyllifoliae* Lakušić 1968 (syntax.syn.)
- *Salicetalia retuso-kitaibelianae* Lakušić 1968 *nom. mut. propos.* (45)
- *Salicetalia retusae* Lakušić 1970 (29)

ARCTIC GROUP OF ALLIANCES

THL-02A *Saxifrago oppositifoliae-Oxyrion digynae* Gjaerevoll 1950

Vegetation of herb-rich snow-beds on stabilized calcareous soils in the boreo-montane belt of Scandinavia and the Arctic archipelago

- *Luzulion nivalis* Nordhagen 1936 (phantom)
- *Polarion* Du Rietz 1942 (orig.form) (2b)
- *Saxifrago-Ranunculion nivalis* Nordhagen 1943 (3b)

thl06 This unit, often used at the level of an alliance, has been described as a suballiance of the *Ranunculo-Oxyrion*; it was also described invalidly since only sociations and 'provisional' associations were assigned to the '*Saxifrago-Ranunculion nivalis*' in the Nordhagen's (1943) protologue. (MC, LM)

- *Polarion* Gjaerevoll 1950 (orig.form) (syntax.syn.)
- *Saxifrago-Ranunculion nivalis* Nordhagen 1954 (phantom)
- *Distichion capillacei* Gjaerevoll 1950 (syntax.syn.)
- *Luzulion arcticae* Gjaerevoll 1950 (2b)
- *Oppositifolio-Oxyrion* Gjaerevoll 1950 (orig.form)

THL-02B *Ranunculo-Poion alpinae* Gjaerevoll ex Daniëls *all. nov. hoc loco*

Vegetation of grassy snow-beds on stabilized calcareous soils in the boreo-montane belt of Scandinavia and the Arctic archipelago

thl07 Herewith we validate the *Ranunculo-Poion alpinae* Gjaerevoll 1950 *nom. inval.* by choosing the *Ranunculo acris-Poetum alpinae* Daniëls *ass. nov. hoc loco* (the *holotypus hoc loco* of the association: relevé 4, Table XIII in Gjaerevoll 1950) as the *holotypus* of the alliance. The diagnostic taxa of this validated alliance are: *Carex bigelowii* subsp. *bigelowii, Persicaria vivipara, Poa alpina, Potentilla crantzii, Ranunculus acris, Saussurea alpina, Solidago virgaurea, Trollius europeus, Viola biflora,* and mosses *Drepanocladus uncinatus* and *Hylocomium splendens*. (FD)

- *Poion alpinae* Du Rietz 1942 (2b)
- *Drepanoclado-Poion alpinae* Hadač 1946 (phantom)
- *Ranunculo-Poion alpinae* Gjaerevoll 1950 (2b)
- *Reticulato-Poion alpinae* Gjaerevoll 1950 (orig.form) (2b)

GLACIAL RELICT ALLIANCE

THL-02C *Arabidion caeruleae* Br.-Bl. in Br.-Bl. et Jenny 1926

Vegetation of snow-beds on stabilized calcareous screes in the alpine and subnival belts of European mountains

- *Salicion retusae* Horvat 1949 (1)
- *Salicion retusae* Horvat 1960 (2b)
- *Salicion retusae* Horvat in Horvat et al. 1974 (syntax.syn.)
- *Soldanello alpinae-Salicion retusae* Englisch 1999 (syntax. syn.)

THL-03 *Drabetalia hoppeanae* Zollitsch in Merxmüller et Zollitsch 1967

Subnival and alpine vegetation on lime-rich shale screes and congelifracted slopes of the Alps and the Pyrenees

- *Drabetalia hoppeanae* Zollitsch 1966 (1)
- *Drabetalia hoppeanae* Zollitsch in Oberd. et al. 1967 (2b)
- *Drabetalia hoppeanae* Zollitsch 1968 (31)

THL-03A *Drabion hoppeanae* Zollitsch in Merxmüller et Zollitsch 1967

Subnival and alpine vegetation on lime-rich shale screes and congelifracted slopes of the Alps

- *Drabion hoppeanae* Zollitsch 1966 (1)
- *Drabion hoppeanae* Zollitsch in Oberd. et al. 1967 (2b)
- *Drabion hoppeanae* Zollitsch 1968 (31)

THL-03B *Androsacion ciliatae* Rivas-Mart. 1988

Subnival and alpine vegetation of summit screes of the Central Pyrenees

THL-04 *Arabido alpinae-Petasitetalia paradoxi* Mucina et Valachovič *ined.*

Vegetation of humid calcareous screes and boulder fields in the montane to subalpine belts of the nemoral mountain ranges of Europe

thl08 The formal description of this unit will be handled elsewhere. (LM)

- *Arabidetalia alpinae* Rübel 1933 (phantom)
- *Arabido alpinae-Petasitetalia paradoxi* Mucina et al. in Šilc et Čarni 2012 (2b, 5)

THL-04A *Petasition paradoxi* Zollitsch ex Lippert 1966

Vegetation of humid calcareous fine-grained screes in the montane and subalpine belts of the Alps

- *Petasition paradoxi* Zollitsch 1966 (1)
- *Gymnocarpion robertiani* Fernández Casas 1970 (syntax. syn.)
- *Dryopteridion submontanae* Rivas-Mart. et al. 1984 (syntax.syn.)
- *Dryopteridion villarsii* Rivas-Mart. et al. 1984 *nom. mut. propos.* (45)

THL-04B *Arabidion alpinae* Béguin in Richard 1971

Vegetation of humid stable coarse-grained calcareous screes and boulder fields in the nemoral mountain ranges of Central Europe

- *Arabidion alpinae* Béguin 1970 (1)
- *Arabidion alpinae* Richard 1972 (31)
- *Arabidion alpinae* Béguin 1974 (31)

THL-04C *Petasition doerfleri* Lakušić D. Lakušić et al. 2015

Vegetation of humid stable coarse-grained calcareous screes and boulder fields of the nemoral mountains of the Central Balkans

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- *Petasition doerfleri* Lakušić 1967 (phantom)
- *Petasition doerfleri* Lakušić 1968 (3f, 8)
- *Petasition doerfleri* Lakušić 1970 (31)

THL-05 *Stipetalia calamagrostis* Oberd. et Seibert in Oberd. 1977

Thermophilous calcareous scree vegetation in the colline to montane belts of Central and Western Europe

- *Thlaspietalia* Br.-Bl. 1931 (2b)
- *Achnatheretalia calamagrostis* Oberd. et Seibert in Oberd. 1977 (30, *mut.illeg.*)

thl09 Rivas-Martínez et al. (2002a: 247) formally suggested this name change. The case was handled by the Nomenclature Commission and suggested for rejection (Willner et al. 2011). (LM)

THL-05A *Pimpinello tragium-Gouffeion arenarioidis* Br.-Bl. in Br.-Bl. et al. 1952

Vegetation of calcareous supramediterranean screes of Southern France and Catalonia

thl10 This alliance was classified in the *Andryaletalia ragusinae* in Bardat et al. (2004). (LM)

- *Pimpinello-Gouffeion* Br.-Bl. in Br.-Bl. et al. 1947 (2b)
- *Pimpinello tragium-Arenarion provincialis* Br.-Bl. in Br.-Bl. et al. 1952 *nom. mut. propos.* (45)

THL-05B *Leontodontion hyoseroidis* Duvigneaud et al. 1970

Vegetation of low-altitude fine calcareous screes of Eastern France

THL-05C *Stipion calamagrostis* Jenny-Lips ex Br.-Bl. 1950

Vegetation of thermophilous low-altitude calcareous screes of Central and Western Europe

thl11 Despite Rivas-Martínez et al. (2011: 236–237) naming eight associations as belonging to the *Stipion* (*Achnatherion*) *calamagrostis* in Spain, we believe that these represent a local endemic alliance that is different from the *Stipion calamagrostis*. (LM)

- *Stipion calamagrostis* Jenny-Lips 1930 (3f)
- *Achnatherion calamagrostis* Jenny-Lips 1930 *nom. mut. propos.* (*mut.superfl.*)

thl12 The proposal serving this name change has been published by Rivas-Martínez et al. (2002a: 247) *sub* '*Achnatherion calamagrostis* Jenny in Br.-Bl., Roussine & Nègre 1952'. (LM, JPT)

- *Stipion calamagrostis* Br.-Bl. 1931 (2b)
- *Stipion calamagrostis* Jenny-Lips ex Quantin 1932 (2b)
- *Stipion calamagrostis* Jenny-Lips ex Br.-Bl. 1948 (2b)
- *Achnatherion calamagrostis* Jenny-Lips ex Br.-Bl. 1948 *nom. mut. propos.* (*mut.superfl.*)
- *Achnatherion calamagrostis* Jenny-Lips ex Br.-Bl. 1950 *nom. mut. propos.* (*mut.superfl.*)
- *Stipion calamagrostis* Br.-Bl. et al. 1952 (31)
- *Teucrion montani* Csűrös et Pop 1965 (syntax.syn.)
- *Scrophularion juratensis* Béguin 1970 (1)
- *Scrophularion juratensis* Richard 1972 (syntax.syn.)
- *Scrophularion juratensis* Béguin 1974 (31)
- *Teucrion montani* Csűrös et Pop 1994 (syntax.syn.)

GROUP OF ORDERS ON SILICEOUS SUBSTRATES

THL-06 *Androsacetalia alpinae* Br.-Bl. in Br.-Bl. et Jenny 1926

• Arctic-alpine and oromediterranean vegetation of siliceous screes and moraines of Europe, the Arctic Ocean islands and Greenland

- *Oxyrietalia digynae* Nordhagen 1936 (phantom)
- *Oxyrietalia digynae* Nordhagen 1937 (2b, 3b)
- *Galietalia roselli* Quézel 1953 (syntax.syn.)
- *Polygonetalia alpini* Lakušić 1968 (phantom)
- *Polygonetalia alpini* Lakušić et al. 1969 (phantom)
- *Polygonetalia alpini* Lakušić et al. 1979 (2b)
- *Polystichetalia lonchitidis* Rivas-Mart. et al. 1984 (syntax. syn.)

thl13 This unit is synonymous with the *Thlaspietalia rotundifolii*. (KD) Because the *Dryopteridion oreadis* is the *holotypus* of this order, this syntaxonomic unit has become a synonym of the *Androsacetalia alpinae*. (LM)

BOREO-ARCTIC ALLIANCE

THL-06A *Antitrichio-Rhodiolion roseae* Hadač 1971

Arctic herb-rich vegetation on damp coarse gravels and deep humus-rich soils over siliceous substrates of Iceland

ALPINE GROUP OF ALLIANCES

THL-06B *Androsacion alpinae* Br.-Bl. in Br.-Bl. et Jenny 1926

Vegetation of siliceous screes and moraines in the alpine and subnival belts of the Alps and the Western Carpathians

- *Allosurion crispi* Jenny-Lips 1930 (2b, 3b)
- *Oxyrion* Gams 1936 (2b)

THL-06C *Veronicion baumgartenii* Coldea 1992

Vegetation of siliceous screes and moraines in the alpine and subnivale belts of the Eastern and Southern Carpathians

THL-06D *Polygono alpini-Poion laxae* D. Lakušić et Mucina *ined.*

Vegetation of siliceous screes and moraines in the alpine and subnival belts of the Dinarides

thl14 The formal description of this unit will be presented elsewhere. (LM)

- *Polygonion alpini* Lakušić 1968 (phantom)
- *Poion laxae* Lakušić et al. 1977 (phantom)
- *Wulfenion rohlenae* Lakušić 1977 (phantom)
- *Poion laxae* Lakušić et al. 1979 (2b)
- *Wulfenion rohlenae* Lakušić in Jovanović et al. 1986 (2b)
- *Polygonion alpini* N. Ranđelović 1995 (phantom)
- *Polygonion alpini* N. Ranđelović in Milosavlević et al. 2008 (2b)

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THL-06E *Dryopteridion oreadis* Rivas-Mart. 1977 *corr.* Rivas-Mart. et al. 1984

Vegetation of montane to subalpine siliceous screes and moraines of the Pyrenees and the Apennines

- *Dryopteridion abbreviatae* Rivas-Mart. 1977 (orig.form) (43)
- *Dryopteridion oreadis* Rivas-Mart. et al. 1982 (2b)
- *Dryopteridion oreadis* Rivas-Mart. 1977 *corr*. Rivas-Mart. et al. 1986 (*mut.superfl.*)

THL-06F *Senecionion leucophylli* Br.-Bl. 1948

Vegetation of mobile fine-grained siliceous screes in alpine belt of the Pyrenees

- *Taraxacion pyrenaici* Nègre 1968 (3b)

THL-06G *Linario saxatilis-Senecionion carpetani* Rivas-Mart. 1964

Vegetation of the siliceous screes and moraines at high altitudes of the mountain ranges of the Central and Northern Iberian Peninsula

- *Phalacrocarpion* Rothmaler 1954 (2b)

THL-06H *Holcion caespitosi* Quézel 1953

Vegetation of oromediterranean siliceous screes and moraines of the Sierra Nevada (Southern Iberian Peninsula)

- *Violo-Linarion glacialis* Esteve et P. Prieto in P. Prieto 1973 (syntax.syn.)

THL-07 *Galeopsietalia segetum* Oberd. et Seibert in Oberd. 1977

Thermophilous silicicolous scree vegetation in the colline to montane belts of Europe

- *Galeopsietalia ladani* Oberd. et Seibert in Oberd. 1977 *nom. mut. propos.* (*mut.superfl.*)

THL-07A *Galeopsion* Oberd. 1957

Colline-submontane silicicolous scree vegetation of Central Europe

- *Galeopsidion* Oberd. 1956 (orig.form) (2b)

THL-07B *Galeopsion pyrenaicae* Rivas-Mart. 1977

Submontane-montane silicicolous scree vegetation of the Pyrenees

GROUP OF ORDERS OF ALLUVIAL TERRACES

THL-08 *Epilobietalia fleischeri* Moor 1958 *nom. conserv. propos.*

Vegetation of montane to subalpine riverine gravel terraces of the nemoral and boreal European mountain ranges and the Caucasus

thl15 The name has been proposed by Moor (1958: 281–282) to replace the earlier name *Myricarietalia* Aichinger 1933 by arguing that *Myricaria gale* is rather a species of the willow scrub, not of the pioneer communities of the river banks along with *Epilobium dodonaei, E. fleischeri* and *Chondrilla chondrilloides*. Since (1) the name *Myricarietalia* Aichinger 1933 has never been used in the literature (see Tüxen 1973), (2) the name '*Epilobietalia fleischeri*' is the name in current use that has been very consistently adopted, and (3) the type of the name *Myricarietalia* Aichinger 1933 is to be considered a *nomen ambiguum* (ICPN art. 36; see Remark *thl19* on *Salicion incanae* Aichinger 1933), I propose to conserve the name *Epilobietalia fleischeri* Moor 1958 against the earlier name *Myricarietalia* Aichinger 1933. (JPT)

- *Myricarietalia* Aichinger 1933 *nom. rejic. propos.*
- *Myricarietalia germanicae* Br.-Bl. in Nordhagen 1936 (phantom)
- *Myricarietalia germanicae* Br.-Bl. ex Nordhagen 1937 (2b)
- *Myricarietalia* G. Br.-Bl. ex Br.-Bl. 1950 (31)

thl16 The name *Myricarietalia germanicae* was invalidly published by G. Braun-Blanquet (1931). The *Epilobion fleischeri,* classified as the unique alliance within the order in the protologue, was invalidly published because the unique association it contains was also invalidly published (ICPN arts. 2b, 8). The invalidity of the latter, the 'association à *Carex incurva* et *Equisetum variegatum*', is due to the absence of the name giving taxon *Carex incurva* in the unique relevé provided as the original diagnosis (ICPN art. 3f). (JPT)

- *Myricarietalia germanicae* G. Br.-Bl. et Br.-Bl. in G. Br.-Bl. 1931 (2b)

thl17 In Braun-Blanquet (1949a: 131) the name *'Myricarietalia* G. Br.-Bl. 1931' was validly published but the last elements needed for the validation was published in 1950, in the sixth and last part of the paper, thus the date of the name is 1950 (ICPN art. 6). Braun-Blanquet (1949a) includes two alliances in the order: the *'Glaucion flavi'*, which is a *nomen nudum*, and the *'Epilobion fleischeri* G. Br.-Bl. 1931', which was invalidly published in G. Braun-Blanquet (1931). However, the *Epilobion fleischeri* contains three associations in Braun-Blanquet (1949a). Among these, the *'Myricarieto-Chondrilletum* Br.-Bl. 1938' was referred to by Volk (1940) with an unambiguous bibliographical reference to be found in the bibliography published in 1950. In Volk (1940), the '*Myricaria-Chondrilla prenanthoides*-Assoziation J. Braun-Blanquet 1939' is validly published and the relevés of this association contain also the two name-giving species *Epilobium fleischeri* (for the alliance) and *Myricaria germanica* (for the order). Therefore, the name *'Epilobion fleischeri'* has a sufficient diagnosis and, as a consequence, so does the name *'Myricarietalia'*. However, the date of both names is 1950 and the correct citations are therefore '*Epilobion fleischeri* G. Br.-Bl. ex Br.-Bl. 1950' and '*Myricarietalia* G. Br.-Bl. ex Br.-Bl. 1950', the latter being a later illegitimate homonym (ICPN art. 31) of the name '*Myricarietalia* Aichinger 1933'. (JPT)

- *Epilobietalia fleischeri* Moor ex Oberd. 1957 (2b)

THL-08A *Calamagrostion neglectae* Nordhagen ex de Molenaar 1976

Vegetation of boreal-subalpine and subarctic riverine gravel terraces of the Alps, Scandinavia and Greenland

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- *Calamagrostion neglectae* Tengwall 1920 (phantom)
- *Calamagrostion neglectae* Nordhagen 1936 (phantom)
- *Calamagrostion neglectae* Nordhagen 1937 (2b)
- *Calamagrostion neglecti* Oberd. 1949 (orig.form) (2b)
- *Calamagrostion neglectae* Preising in Oberd. 1949 (phantom)
- *Calamagrostion neglectae* Oberd. 1950 (phantom)

THL-08B *Calamagrostion pseudophragmitis* Rivas-Mart. et al. 1984

Vegetation of montane-subalpine riverine gravel terraces of the Pyrenees and the Cantabrian Mountains

thl18 Placement of this alliance into the *Stipetalia (Achnatheretalia) calamagrostis* by Rivas-Martínez et al. (2011: 237) is not warranted. (LM)

THL-08C *Epilobion fleischeri* G. Br.-Bl. ex Br.-Bl. 1950

Vegetation of the montane-subalpine riverine gravel terraces of the Alps and the Carpathians

thl19 The name *Epilobion fleischeri* G. Braun-Blanquet ex Braun-Blanquet 1950 has been widely and consistently used to designate pioneer vegetation of the montane and subalpine river banks and moraines. It deserves to be conserved against the name *Salicion incanae* Aichinger 1933, in as much as the latter name is proposed as a *nomen ambiguum* (see Remark *thl19*). (JPT)

- *Epilobion fleischeri* G. Br.-Bl. et Br.-Bl. in G. Br.-Bl. 1931 (2b)
- *Salicion incanae* Aichinger 1933 *nom. ambig. rejic. propos.* (36)

thl20 The name has been used mainly for willow scrub in the sense of the name *Salicion eleagni* Moor 1958. Only recently have some authors (e.g. Grabherr & Mucina 1993; Willner & Grabherr 2007) used it in the sense of its type, i.e. for pioneer vegetation of river banks. Indeed, it does not appear to be found in the literature in that sense and it was not mentioned in Tüxen (1973) either. Therefore, considering that a re-introduction of the name in its correct sense would be a source of continual error (ICPN art. 36), it is proposed to consider the name *Salicion incanae* Aichinger 1933 a *nomen ambiguum*. (JPT)

- *Salicion eleagni* Aichinger 1933 *nom. mut. propos.* (45)

thl21 Rivas-Martínez et al. (2002a: 276) formally suggested this name change. (LM)

- *Epilobion fleischeri* G. Br.-Bl. ex Br.-Bl. 1949 (phantom)

THL-08D *Murbeckiello huetii-Epilobion dodonaei* Belonovskaya et al. 2014

Vegetation of montane-subalpine riverine gravel terraces of the Caucasus

- *Murbeckiellion huetii* Onipchenko 2002 (Veröff. Geobot. Inst. ETH Zürich) (2b)
- *Murbeckiellion huetii* Onipchenko 2002 (Biul. Mosk. Obshch. Ispyt. Prir., Otd. Biol.) (2b)

THL-09 *Andryaletalia ragusinae* Rivas Goday in Rivas Goday et Esteve 1972

Vegetation of riverine gravel terraces in the thermo- to supramediterranean belts of southwestern Europe

thl22 A proposal to reject this name as *nomen ambiguum* was made by Englisch et al. (1993: 326; see also Theurillat 1997). (LM)

- *Andryaletalia ragusinae* Rivas Goday et Rivas-Mart. 1963 (3b)
- *Andryaletalia ragusinae* Rivas Goday 1964 (3b)
- *Andryaletalia ragusinae* Rivas Goday et Rivas-Mart. ex O. de Bolòs et Vigo in Folch 1981 (31)

THL-09A *Glaucion flavi* Br.-Bl. ex Tchou 1948

Pioneer ephemeral herbaceous vegetation on eutrophic gravel deposits of the terraces of summer-low rivers of the Mediterranean

- *Glaucion flavi* Br.-Bl. in Br.-Bl. et al. 1947 (2b)
- *Andryalo-Glaucion flavi* (Br.-Bl. 1957) O. de Bolòs 1962 (phantom)
- *Andryalo-Glaucion flavi* (Br.-Bl. 1957) O. de Bolòs 1964 (29)

THL-09B *Scrophularion sciophilae* O. de Bolòs 1957

Meso-supramediterranean herbaceous vegetation on calcareous rocky slopes and screes of the Eastern Iberian Peninsula

- *Scrophularion tanacetifoliae* O. de Bolòs 1957 *nom. mut. propos.* (45)

thl23 The position of this alliance is problematic and at this stage it is not possible to state if it should be classified within the *Thlaspietea rotundifolii* or within the *Drypidetea spinosae*. (LM)

ORDER OF HEAVY-METAL RICH SCREE VEGETATION

THL-10 *Violetalia calaminari* Br.-Bl. et Tx. ex Ernst 1965

Heavy-metal tolerant vegetation on mining spoil heaps of cool-temperate Europe

- *Violetalia calaminariae* Br.-Bl. et Tx. 1943 (2b)

THL-10A *Thlaspion calaminarii* Ernst 1965

Heavy-metal tolerant vegetation on mining spoil heaps of Western Europe

THL-10B *Armerion halleri* Ernst 1965

Heavy-metal tolerant vegetation on mining spoil heaps of Central Europe

LAM *Lamio tomentosi-Chaerophylletea humilis* Belonovskaya et al. 2014

High-altitude siliceous scree vegetation of the Caucasus

lam01 For the nomenclatural history and the protologue of this class see Belonovskaya et al. (2014). (LM)

- *Veronico telephiifoliae-Lamietea tomentosi* Belonovskaya 2012 (2b)

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LAM-01 *Chaerophylletalia humilis* Onipchenko 2002
Subnival and upper alpine vegetation on siliceous screes, moraines, stone fields and floodplain pebble beds of the Caucasus
- *Veronico telephiifoliae-Lamietalia tomentosi* Belonovskaya 2012 (2b)

LAM-01A *Chaerophyllion humilis* Onipchenko 2002
Subnival and upper alpine vegetation on siliceous screes and boulder fields of the Caucasus
- *Drabo scabrae-Eunomion rotundifoliae* Belonovskaya 2012 (3b, 5)

LAM-01B *Scrophulario minimae-Symphyolomion graveolentis* Belonovskaya et al. 2014
Lower alpine and subalpine vegetation on siliceous screes and boulder fields of the Caucasus
- *Scrophulario minimae-Symphyolomion graveolentis* Belonovskaya 2012 (5)

PHA *Phagnalo saxatilis-Rumicetea indurati* (Rivas Goday et Esteve 1972) Rivas-Mart. et al. 1973
Rupicolous chamaephytic and hemicryptophytic vegetation of rock shelves, broad crevices and gravel slopes of the Iberian Peninsula and Western Maghreb
pha01 The syntaxonomic position of this class is contentious because it was considered as a part of the *Asplenietea trichomanis* by some authors. The character species of the latter class are, however, rare in these communities, whereas the local and regional (Iberian) endemics are prevalent. At this stage this class can be considered a geographic analogue to the *Drypidetea spinosi*, but the syntaxonomic make-up of the *Phagnalo-Rumicetea* is highly heterogeneous (including communities of rock fissures, screes and alluvial beds on silicicolous, ultramafic and calcareous substrates) and therefore there is a need for revision of this class and explanation of the nature of the major ecological and evolutionary drivers shaping its ecology and species composition. (LM)

PHA-01 *Phagnalo saxatilis-Rumicetalia indurati* Rivas Goday et Esteve 1972
Rupicolous chamaephytic and hemicryptophytic vegetation of rock shelves, broad crevices and gravel slopes of the Iberian Peninsula and Western Maghreb

SILICICOLOUS AND ULTRAMAFIC GROUP OF ALLIANCES

PHA-01A *Gymnogrammo-Scrophularion* Rivas Goday 1964
Meso-oromediterranean rupicolous vegetation of exposed siliceous rock-shelves of the Central and Western Iberian Peninsula
- *Rumici-Dianthion lusitani* Rivas-Mart. et al. 1973 (2b)
- *Rumici indurati-Dianthion lusitani* Rivas-Mart., Izco et M. Costa in Rivas-Mart. et al. 1986 (syntax.syn.)
- *Gymnogrammo-Scrophularion* Rivas Goday ex M.A. Alonso et al. 1998 (31)

PHA-01B *Saxifragion continentalis* Rivas-Mart. in Rivas-Mart. et al. 1986
Supramediterranean rupicolous vegetation of siliceous shady crevices of the Central and Western Iberian Peninsula
- *Saxifragion fragosoi* Rivas-Mart. in Rivas-Mart. et al. 1986

pha02 Rivas-Martínez et al. (2002a: 278) formally suggested this name change. (LM)

PHA-01C *Sesamoidion suffruticosae* Ortiz et Pulgar 2000
Rupicolous vegetation of siliceous crevices and gravel slopes of temperate Southern Galicia and Northern Portugal

PHA-01D *Melico minutae-Phagnalion intermedii* Rivas Goday et Esteve 1972
Thermo-mesomediterranean rupicolous vegetation of dolomitic crevices or gravel slopes of southeastern Spain

CALCICOLOUS ALLIANCE

PHA-01E *Calendulo lusitanicae-Antirrhinion linkiani* Ladero et al. 1991
Rupicolous vegetation of calcareous crevices and rock shelves of Central and Western Portugal

ALLUVIAL GROUP OF ALLIANCES

PHA-01F *Andryalion ragusinae* Rivas Goday et Esteve 1972
Thermo-supramediterranean rupicolous vegetation of dolomite and ultramafic gravel slopes and screes of the Southern Iberian Peninsula
- *Andryalion ramosissimae* Rivas Goday et Esteve 1972 *nom. mut. propos.* (45)
- *Andryalo ramosissimae-Crambion filiformis* (Rivas Goday et Esteve 1972) Rivas-Mart. et al. 1973 (29c)

pha03 The original diagnosis of the alliance '*Andryalion ragusinae*' by Rivas Goday et Esteve Chueca (1972) contains two validly published associations. The authors divide the alliance in two edaphic suballiances; one of them, the suballiance '*dolomiticola*' includes both associations of the alliance. Rivas-Martínez et al. (1973: 28) proposed the name '*Andryalo-Crambion filiformis*' for the suballiance '*dolomiticola*' at the alliance rank. However, since the *Andryalo-Crambion filiformis* contains the original diagnosis of the *Andryalion ragusinae*, the former alliance name automatically becomes a *nomen superfluum* (ICPN art. 29c). (RG, LM, JPT)

PHA-01G *Festucion duriotaganae* Capelo et al. 1998
Thermo-mesomediterranean silicicolous grasslands on gravelly river beds of the Western Iberian rivers

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DRY *Drypidetea spinosae* Quézel 1964
Vegetation of scree habitats and pebble alluvia in the submediterranean montane and supra-oromediterranean belts of the Central and Eastern Mediterranean and the Black Sea seaboards
- *Onosmo polyphyllae-Ptilostemonetea* Korzhenevskii 1990 (syntax.syn.)
- *Scrophulario-Helichrysetea italici* S. Brullo et al. 1998 (syntax.syn.)

DRY-01 *Drypidetalia spinosae* Quézel 1964
Montane submediterranean and oromediterranean scree vegetation of the Balkans, Crete and Crimea
- *Arabidetalia flavescentis* Lakušić 1966 (phantom)
- *Arabidetalia flavescentis* Lakušić 1968 (syntax.syn.)
- *Arabidetalia alpinae-flavescentis* Lakušić 1970 (29)
- *Scutellarietalia-Scutellarion hirtae* Zaffran 1990 (orig.form) (3b, 3e, 5)

GROUP OF SUBMEDITERRANEAN ALLIANCES
DRY-01A *Peltarion alliaceae* Horvatić in Domac 1957
Limestone scree vegetation in the submontane and montane belts of the Central Balkans
- *Peltarion alliaceae* Horvatić 1956 (1)
- *Corydalion ochroleucae* Lakušić 1975 (2b)

DRY-01B *Silenion marginatae* Lakušić 1968
Limestone scree vegetation in the montane to subalpine belts of the Southern Dinarides
- *Silenion marginatae* Lakušić 1967 (phantom)
- *Silenion marginatae* Lakušić 1970 (31)
- *Rumicion scutati* Lakušić 1975 (2b)
- *Silenion prostratae* Trinajstić 2008 (5)

DRY-01C *Rumici scutati-Heracleion stevenii* Ryff 2007
Limestone scree vegetation in the montane belt of Crimea

GROUP OF OROMEDITERRANEAN ALLIANCES
DRY-01D *Silenion caesiae* Quézel 1964
Limestone scree vegetation in the supra- and oromediterranean belts of peninsular Hellas
DRY-01E *Campanulion hawkinsianae* Quézel 1967
Ultramafic scree vegetation in the supra- and oromediterranean belts of the Pindos Mountains (Sterea Hellas)
DRY-01F *Alysso sphaciotici-Valantion apricae* Bergmeier 2002
Limestone and dolomite scree vegetation in the oromediterranean belt of Crete
- *Scutellarion hirtae* Zaffran 1990 (5)

DRY-02 *Onosmo polyphyllae-Ptilostemonetalia* Korzhenevskii 1990
Thermophilous submediterranean herb-rich vegetation on eroding slopes of the Black Sea seaboards of Crimea
dry02 Ukrainian and Russian authors prefer to classify this order into its own class, the *Onosmo-Ptilostemonetea* (Korzhenevskii 1990; Korzhenevskii & Ryff 2002; Ryff 2004; Solomakha 2008; Golub et al. 2011). Apart from this order, Golub et al. (2011) described the *Seslerietalia ponticae* (occurring along the Black Sea coast of the piedmonts of the Caucasus). Golub et al. (2011) used fragmentary comparative material of several *Stipion calamagrostis* communities to support their claim of a large floristic dissimilarity between the *Onosmo-Ptilostemonetea* and the *Thlaspietea rotundifoliae,* and as a consequence, their analysis remains unconvincing. However, the ecology of the *Onosmo-Ptilostemonetalia* as well as the high number of (sub)mediterranean elements typical of disturbed soils (from erosion and formation of screes) suggests that this order can be considered a geographic analogue of the *Drypidetalia spinosae*. (LM)
- *Cephalario-Seselietalia dichotomi* Ryff 2004 (syntax.syn.)

DRY-02A *Ptilostemonion echinocephali* Korzhenevskii 1990
Thermophilous submediterranean herb-rich vegetation on eroding flysch slopes of Crimea
DRY-02B *Gypsophilo glomeratae-Cephalarion coriaceae* Ryff in Golub et al. 2011
Thermophilous submediterranean herb-rich vegetation on eroding marl and limestone slopes of Crimea
- *Elytrigio elongatae-Onobrychidion pallasii* Ryff 2004
- *Gypsophilo glomeratae-Cephalarion coriaceae* Ryff 2004

DRY-02C *Austrodauco-Salvion verticillati* Korzhenevskii et Kliukin 1990
Thermophilous submediterranean herb-rich vegetation on eroding magmatic bedrocks and hornstones of Crimea
- *Austrodauco-Salvivion verticillati* Korzhenevskii 1990 (orig.form)
- *Austrodauco-Salvion verticillati* Korzhenevskii 1990 (2b)
- *Vicio hirsutae-Galion aparines* Ryff 1999 (5)

dry03 The *Vicio hirsutae-Galio aparines* is an invalidly described syntaxon because the association selected by Ryff (1999), the *Galio aparines-Scutellarietum albidae* is also invalidly published because a subassociation (sic!) (*G.a.-S.a. alyssetosum calycocarpi*; Ryff 1999: 77) instead of relevé was chosen as the 'nomenclature type' of the association. (LM)

DRY-03 *Scrophulario-Helichrysetalia* S. Brullo 1984
Vegetation of thermophilous low and mid-altitudes (sub)mediterranean screes and riverine gravel banks of Sardinia, Calabria and Sicily
dry04 Brullo (1984) suggested that this syntaxonomic concept deserves recognition as a class in its own right (*Scrophulario-Helichrysetea*) since the scree communities of Southern Italy and the Tyrrhenian archipelago lack the character species of the *Thlaspietea rotundifolii* (a view also supported by SP). Here I offer a new, yet still only tentative

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solution, suggesting that the *Scrophulario-Helichrysetalia* are a Central Mediterranean analogue of the *Drypidetalia* and therefore should be classified within the *Drypidetea*. Further study is needed to clarify the position of this scree vegetation. (LM)

DRY-03A *Linarion purpureae* S. Brullo 1984

Montane scree vegetation of the Southern Apennines and Sicily

DRY-03B *Arrhenatherion sardoi* Gamisans 1989

Montane grassy screes of Corsica

DRY-03C *Ptilostemono casabonae-Euphorbion cupanii* Angiolini et al. 2005

Vegetation of ancient toxic mining dumps of Sardinia

DRY-03D *Euphorbion rigidae* S. Brullo et Spampinato 1990

Siculo-Calabrian low-altitude pioneer vegetation on riverine gravel banks

- *Artemision variabilis* Biondi et al. 1994 (syntax.syn.)

dry05 In the original description of this syntaxon (Biondi et al. 1994), the *Artemision variabilis* has been classified within the *Salsolo-Peganetalia harmalae* (*Pegano-Salsoletea*). (LM)

VEGETATION OF ARCTIC-ALPINE VEGETATION OF SNOW-RICH HABITATS

HER *Salicetea herbaceae* Br.-Bl. 1948

Arctic and alpine-subnival snow-bed vegetation at high altitudes of the mountain ranges of Eurasia and the Arctic Ocean islands

- *Salicetea herbaceae* Br.-Bl. in Br.-Bl. et al. 1947 (2b)
- *Salicetea herbaceae* Br.-Bl. 1949 (31)
- *Salicetea retusae-serpyllifoliae* Lakušić 1968 (phantom)

HER-01 *Salicetalia herbaceae* Br.-Bl. in Br.-Bl. et Jenny 1926

Arctic and alpine-subnival snow-bed vegetation at high altitudes of the mountain ranges of Eurasia and the Arctic Ocean islands

- *Hyalopoetalia ponticae* Onipchenko 2002 (syntax.syn.)

GLACIAL RELICT GROUP OF ALLIANCES

HER-01A *Salicion herbaceae* Br.-Bl. in Br.-Bl. et Jenny 1926

Snow-bed communities on siliceous substrates in the alpine and nival belts of the mountain ranges of the nemoral zone of Europe

- *Luzulion spadiceae* Rübel 1933 (2b)
- *Nardo-Salicion herbaceae* Englisch 1999 (syntax.syn.)

HER-01B *Salici herbaceae-Arabidion caeruleae* Englisch 1999

Snow-bed communities on acidified calcareous substrates in the alpine and nival belts of the mountain ranges in the nemoral zone of Europe

HER-01C *Salici herbaceae-Caricion lachenalii* Béguin et Theurillat 1982

Vegetation of sandy-gravely siliceous alluvia dominated by arctic-alpine elements in the alpine belt of the Alps

her01 This is a particular alpine syntaxon of open vegetation occupying only small linear patches in ecotones spanning the wetlands of the *Montio-Cardaminetea*, alpine fens of the *Caricion fuscae* and the *Salicion herbaceae* snow beds in the alpine belt of the Alps on siliceous bedrocks. Ecologically it is equivalent to the neutral-basiphilous *Caricion atrofusco-saxatilis* Nordhagen 1943. This syntaxon was recognized as being different from the *Salicion herbaceae* also by Englisch (1999) and Steiner (2002). (JPT, LM)

HER-01D *Festucion picturatae* Krajina 1933 *corr.* Dúbravcová 2007

Snow-bed tall grasslands of stabilized siliceous scree gullies irrigated by melt waters in alpine belt of the Alps and the Carpathians

her02 The correction of the name was performed by Dúbravcová in Kliment & Valachovič (2007: 269). (LM)

- *Festucion pictae* Krajina 1933 (43)

HER-01E *Ranunculion crenati* Lakušić 1968

Snow-bed vegetation on siliceous substrates in the alpine belt of the central and southern regions of the Balkan Peninsula

- *Ranunculion crenati* Lakušić 1970 (31)

HER-01F *Sedion candollei* Rivas-Mart., Fernández-González et Loidi in Rivas-Mart. et al. 2011

Cryo-oromediterranean snow-bed vegetation on siliceous substrates of the Iberian Peninsula

- *Mucizonion sedoidis* Rivas-Mart. et al. 1999 (3b)
- *Sedion candollei* Rivas-Mart. et al. 1999 *nom. mut. propos.* (2b, *mut.superfl.*)

her03 Rivas-Martínez et al. (2002a: 279) formally suggested this name change. (LM)

HER-01G *Hyalopoion ponticae* Rabotnova et Onipchenko in Onipchenko 2002

Snow-bed vegetation on siliceous substrates in the alpine belt of the Caucasus

- *Sibbaldion semiglabrae* Rabotnova in Onipchenko et al. 1987 (1)
- *Saxifragion sibiricae* Onipchenko 2002 (syntax.syn.)
- *Colpodion variegati* Korotkov 2006 (2b)
- *Colpodion variegati* Korotkov 2013 (29)

ARCTIC GROUP OF ALLIANCES

HER-01H *Cassiopo-Salicion herbaceae* Nordhagen 1943

Arctic and boreo-arctic late snow-free snow-bed dwarf scrub on siliceous substrates of Scandinavia, Svalbard, Iceland and Greenland

- *Cassiopeto-Salicion herbaceae* Nordhagen 1936 (orig.form) (phantom)

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- *Cassiopeto-Salicion herbaceae* Nordhagen 1937 (orig.form) (phantom)
- *Salicion herbaceae* Du Rietz 1942 (2b)
- *Polytrichion norvegici* Gjaerevoll 1949 (syntax.syn.)
- *Herbaceon* Gjaerevoll 1950 (orig.form) (29, 31)

HER-01I *Deschampsio-Anthoxanthion* Gjaerevoll 1950

Boreo-arctic Scandinavian late snow-free snow-bed vegetation on stable oligotrophic soils not experiencing seasonal waterlogging or ground ice

- *Deschampsio-Anthoxanthion* Du Rietz 1942 (2b)
- *Deschampsio-Anthoxanthion* Gjaerevoll 1956 (29)
- *Deschampsio-Anthoxanthion* Dahl 1957 (31)

HER-01J *Saxifrago stellaris-Oxyrion digynae* Gjaerevoll 1950

Vegetation of herb-rich acidic water-saturated solifluction snowfields in the alpine belt of Scandinavia and the Middle Arctic zone

- *Ranunculo-Oxyrion digynae* Nordhagen 1936 (phantom)
- *Ranunculo-Oxyrion digynae* Nordhagen 1937 (2b)
- *Ranunculo-Oxyrion digynae* Nordhagen 1943 (2b)
- *Stellaro-Oxyrion digynae* Gjaerevoll 1950 (orig.form)
- *Stellaro-Oxyrion digynae* Gjaerevoll 1956 (orig.form) (31)
- *Luzulion arcuatae* Elvebakk 1985 (3b)

VEGETATION OF SALINE AND BRACKISH WATERS AND SWAMPS

ZOS *Zosteretea* Pignatti 1953

Vegetation of sea-grass meadows on muddy and sandy submerged substrates of the temperate and subarctic seas surrounding Europe

zos01 Den Hartog (1976) recognized the *Posidonietea* and the *Halodulo-Thalassietea* as classes in their own right. Both were unfortunately invalidly published in his paper. (LM)

- *Posidonietea* Den Hartog 1976 (2b)
- *Posidonietea* Den Hartog ex Géhu in Bardat et al. 2004 (2b)
- *Posidonietea oceanicae* Den Hartog ex Mucina in Mucina et al. 2016 (syntax.syn.)

ZOS-01 *Zosteretalia* Béguinot ex Pignatti 1953

Vegetation of sea-grass meadows of the sandy-muddy sublittoral of the temperate seas surrounding Europe

- *Zosteretalia* Béguinot 1941 (2b)
- *Nanozosteretalia* Den Hartog 2003 (2b, 5)

ZOS-01A *Zosterion marinae* Br.-Bl. et Tx. ex Pignatti 1953

Vegetation of perennial sea-grass meadows of the sandy-muddy sea sublittoral of the cold- and cool-temperate seas surrounding Europe

- *Zosterion* Christiansen 1934 (2b)
- *Zosterion* Br.-Bl. et Tx. 1943 (2b)
- *Zosterion balticum* Luther 1951 (34a)

ZOS-01B *Nanozosterion noltii* Den Hartog ex Mucina *all. nov. hoc loco*

Vegetation of short-lived sea grass meadows of the sandy-muddy sea sublittoral of the cold-temperate and cool-temperate seas surrounding Europe

zos02 Den Hartog (2003: 215) published the *Nanozosterion* and included the *Zosteretum noltii* Harmsen 1936 (*sub* '*Zosteretum nanae*') in the original diagnosis of the alliance. In Harmsen (1936: 871), the name '*Zosteretum nanae*' is a *nomen nudum*, with no relevés and no references to the published relevés. The name '*Nanozosterion* Den Hartog 2003' lacks a sufficient diagnosis and therefore it is invalidly published (IPCN art. 2b). The *Nanozosterion* of Den Hartog (2003: 215) is, however, a convincing syntaxonomic concept and therefore I validate the name here by designating the *Zosteretum nanae* Pignatti 1953 as the *holotypus (hoc loco)* of the alliance. The latter association was typified (*neotypus*) by Giaccone et al. (1994). The *Zosteretum nanae* was validly published by Pignatii (1953: 86), who used a one-species synoptic table. *Zostera noltii* Hornem. (= *Nanozostera noltii* (Hornem.) Tolm. & Posl.) is the character species of the *Nanozosterion*. (LM)

- *Nanozosterion* Den Hartog 2003 (2b, 5)

ZOS-02 *Posidonietalia oceanicae* Den Hartog ex Mucina *ordo nov. hoc loco*

Vegetation of perennial sea-grass meadows of the sandy-rocky sublittoral of the warm-temperate waters of the Mediterranean Sea

zos03 Herewith I validate the *Posidonietalia oceanicae* by designating the *Posidonion oceanicae* Br.-Bl. ex Molinier 1960 as the *holotypus (hoc loco)* of the order. *Posidonia oceanica* is the only character species of this order. The typification of the *Posidonietalia* (using the *Posidonion* Br.-Bl. et al. 1952) by Bardat et al. (2004) is invalid since the *Posidonion* Br.-Bl. et al. 1952 was invalidly described. Accordingly, the validation of the *Posidonietea oceanicae* (Bardat et al. 2004) is also invalid. Given the preference of some authors to use the *Posidonietea oceanicae* as an acceptable syntaxonomic concept in its own right, here I validate the name of the class by designating the validated *Posidonion oceanicae* Den Harrog ex Mucina in Mucina et al. 2016 as the *holotypus* (*hoc loco*) of the class. (LM)

- *Halobenthalia* Chapman 1959 p.p. (3d)
- *Posidonietalia* Den Hartog 1976 (2b)
- *Posidonietalia oceanicae* Den Hartog ex Géhu in Bardat et al. 2004 (2b)

ZOS-02A *Posidonion oceanicae* Br.-Bl. ex Molinier 1960

Vegetation of perennial sea-grass meadows of the sandy-rocky sublittoral of the warm-temperate waters of the Mediterranean Sea

zos04 Molinier (1960: 244) described the *Posidonietum oceanicae* in Table VII that contained three relevés of the

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Posidonietum oceanicae s. str. together with the relevés of a separate association (of algal communities), the '*Udoteo-Peyssonnelietium*'. In Table VIII these two associations were classified into the '*Posidion* Br. Bl. 1931' that results in validation of the latter alliance under the name '*Posidonion oceanicae* Braun-Blanquet ex Molinier 1960'. The *Posidonietum oceanicae* Molinier 1960 is herewith becoming the type of the alliance (*holotypus hoc loco;* Molinier 1960: 244). *Posidonia oceanica* is the only character species of this alliance. (JPT, LM) Giaccone & Di Martino (1997) classified the communities with *Posidonia oceanica* in the *Zosterion*. (JPT)

- *Posidonion* Br.-Bl. 1931 (2b)
- *Posidonion oceanicae* Br.-Bl. 1933 (2b)
- *Posidonion oceanicae* Br.-Bl. in Br.-Bl. al.al 1947 (2b)
- *Posidonion oceanicae* Br.-Bl. In Br.-Bl. et al. 1952 (2b)

HAL *Halodulo wrightii-Thalassietea testudinum* Rivas-Mart. et al. 1999

Vegetation of eel-grass swards on muddy and sandy substrates of subtropical and tropical seas fringing Atlantic Ocean

hal01 The *Halodulo-Thalassietea* is essentially a tropical vegetation unit, though it shows some extrusions into subtropical and sometimes warm temperate seas, such as the northern Red Sea, the Persian Gulf, part of the Gulf of Mexico, seas around Bermuda and the Canary Islands which all under the influence of warm sea currents. The *Cymodoceion nodosae* is structurally a member of the same class. The main algal component of the *Cymodoceion nodosae* is *Caulerpa prolifera,* a species of a large genus mainly distributed in tropical seas. The *Cymodoceion nodosae* probably emerged as a relict unit after the original Tethys Ocean experienced large-scale geological changes. The genus *Cymodocea* no longer occurs in America, but it is known there from the Eocene (Lumbert et al. 1984). (C. Den Hartog)

- *Halophilo-Cymodoceetea* Knapp 1968 (2b)
- *Halodulo-Thalassietea* Den Hartog 1976 (2b)

HAL-01 *Thalassio-Syringodetalia filiformis* Knapp ex Borhidi et al. 1979

Vegetation of eel-grass swards on muddy and sandy substrates of the sublittoral of subtropical and tropical seas fringing Atlantic Ocean

hal02 The name of the order has been validated by Borhidi et al. (1979) by assigning the only alliance, the *Syringodio-Thalassion* Borhidi in Borhidi et al. 1979, containing two associations of which the *Syringodio-Thalassietum* Ciferri 1936 was validly described. Hence this becomes an automatic nomenclature type of the alliance (ICPN art. 20). (LM)

- *Thalassio-Syringodetalia filiformis* Knapp 1964 (2b)
- *Halophilo-Cymodoceetalia* Knapp 1968 (2b)
- *Thalassietalia* Den Hartog 1976 (2b)

HAL-01A *Cymodoceion nodosae* Den Hartog ex Mucina *all. nov. hoc loco*

Vegetation of eel-grass swards on muddy and sandy substrates of the sublittoral of the subtropical Atlantic Ocean and the Mediterranean Sea

hal03 The *Cymodoceion nodosae* (Den Hartog 1976) is invalidly described (ICPN arts. 2b, 8) since the *Cymodoceetum nodosae* assigned to this alliance (Den Hartog 1976: 254) is a *nomen nudum*. It also remained invalidly described in Den Hartog (2003) since the '*Cymodoceetum nodosae* Feldmann 1937' (there is a direct reference to Feldmann 1937 in the references) was also a *nomen nudum*. Feldmann (1937: 243) presented a description of the 'Association à *Cymodocea nodosa*', however, no relevé was presented. Costa et al. (2012: 4) selected '*Cymodoceetum nodosae* Feldmann 1937' explicitly as the '*typus*' of the '*Cymodoceion nodosae* Den Hartog 1976', however this validation is ineffective since an invalid association was used for the typification. It appears that Giaccone & Pignatti (1967) published the first valid description of the *Cymodoceetum nodosae*. Giaccone et al. (1994: 133) selected the type (*lectotypus*) relevé from Giaccone & Pignatti (1967). Here I validate the *Cymodoceion nodosae* by designating the validly described *Cymodoceetum nodosae* Giaccone et Pignatti 1967 as the *holotypus (hoc loco)* of the alliance. The character-species of the alliance is *Cymodocea nodosa*. (LM)

- *Cymodoceion nodosae* Den Hartog 1976 (2b)
- *Syringodio-Thalassion testudinum* Borhidi 1996 (*sensu* Rivas-Martínez et al. 1999) (pseudonym)

hal04 According to Den Hartog (2003), the *Syringodio-Thalassion testudinum* is limited to the Caribbean and the Gulf of Mexico. Rivas-Martínez et al. (1999) misinterpreted this concept using the name '*Syringodio-Thalassion testudinum* Borhidi 1996' for the *Cymodocea nodosa* and *Halophila stipulacea* communities rightly classified within the *Cymodoceion nodosae*. (LM)

RUP *Ruppietea maritimae* J. Tx. ex Den Hartog et Segal 1964

Submerged rooted herbaceous vegetation of brackish waters of the World

- *Ruppietea* J. Tx. 1960 (2b)
- *Eleocharitetea parvulae* Segal 1965 (3b)
- *Eleocharitetea parvulae* Segal 1968 (3b)
- *Rielletea helicophyllae* Cirujano et al. 1993 (syntax.syn.)

RUP-01 *Ruppietalia* J. Tx. ex Den Hartog et Segal 1964 *nom. conserv. propos.*

Submerged rooted herbaceous vegetation of temperate brackish waters of Europe

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- *Zosteretalia* Br.-Bl. et Tx. 1943 (2b)
- *Zosteretalia* Br.-Bl. et Tx. in Br.-Bl. et al. 1952 *nom. ambig. rejic. propos.* (36)

rup01 This name was used in the past for the order comprising communities with the *Ruppion maritimae* (see Dengler et al. 2004). To avoid further confusion resulting from erroneous use of this name, we suggest to reject this name as *nomen ambiguum* and to conserve the name *Ruppietalia* J. Tx. ex Den Hartog et Segal 1964 for this particular syntaxon. (JD)

- *Halobenthalia* Chapman 1959 p.p. (3d)
- *Ruppietalia maritimae* J. Tx. 1960 (2b)
- *Eleocharitetalia parvulae* Segal 1965 (syntax.syn.)

rup02 This order should be placed in the *Juncetea maritimi*. (KD)

- *Eleocharitetalia parvulae* Segal 1968 (31)
- *Zannichellio-Ruppietalia* J. Tx. 60 em. Den Hartog 1981 (orig.form) (phantom)
- *Zannichellio-Ruppietalia* Den Hartog 1985 (phantom)
- *Rielletalia helicophyllae* Cirujano et al. 1993 (syntax.syn.)
- *Zannichellio-Ruppietalia* Schaminée et Den Hartog in Schaminée et al. 1995 (29)

RUP-01A *Ruppion maritimae* Br.-Bl. ex Westhoff in Bennema et al. 1943

Submerged rooted herbaceous vegetation of temperate brackish waters of Europe

- *Ruppion maritimae* Br.-Bl. 1931 (2b)
- *Ruppion maritimae* Br.-Bl. et de Leeuw 1936 (2b)
- *Ruppion maritimae* Br.-Bl. ex Soó 1947 (31)
- *Ruppion maritimae* Br.-Bl. in Br.-Bl. et al. 1952 (31)
- *Eleocharition parvulae* Segal 1965 (syntax.syn.)

rup03 This alliance was validly described by Segal (1965), who assigned here only one (validly published) association, the *Eleocharitetum parvulae* Gillner 1960. (LM)

- *Eleocharition parvulae* Segal 1968 (31)
- *Scirpion parvuli* Segal 1968 (phantom)

rup04 A proposal serving the mutation of this name published by Rivas-Martínez et al. (2002a: 258) is not warranted since the name *Scirpion parvuli* does not exist in Segal (1968). (LM)

- *Althenio-Ruppion* Den Hartog 1981 (phantom)
- *Althenio-Ruppion* Den Hartog 1985 (2b)
- *Ruppion cirrhosae* Lovrić in Lovrić et Rac 1987 (2b)
- *Riellion parvulae* Cirujano et al. 1993 (phantom)
- *Riellion helicophyllae* Cirujano et al. 1993 (syntax.syn.)

SPA *Spartinetea maritimae* Beeftink 1962

Pioneer vegetation of perennial cord grasses on tidal flats of temperate seas of the World

spa01 The floristic and ecological differences between this unit and the *Thero-Salicornietea* Tx. in Tx. et Oberd. 1958 are considered as minor by some authors, suggesting inclusion of the *Spartinion glabrae* Conrad 1935 into the *Thero-Salicornietalia* Pignatti 1953. The vegetation classified within the latter syntaxa is found often in close proximity under very similar ecological conditions, only differentiated by a moderate difference in life-form prevalence. The comprehensive vegetation tables in Schaminée et al. (1998a) suggest that those species considered as character species of one class are also very frequent in the other class too, making their separation at class level doubtful. (JD) LM disagrees as there is fundamental ecological and vegetation-dynamical difference between the annual-herb dominated *Thero-Salicornietea* and the perennial-grass dominated *Spartinetea.* The former vegetation often forms micropatches within the swards of *Spartina* and using larger sampling plots would naturally result in co-occurrence of the typical species of the respective classes.

- *Spartinetea maritimae* Tx. in Lohmeyer et al. 1962 (2b)
- *Spartinetea glabrae* Tx. in Beeftink 1962 *nom. mut. propos.* (*sensu* Bardat et al. 2004) (*mut.superfl.*)
- *Coeno-Spartinetea* Tx. 1964 (phantom)
- *Spartinetea maritimae* Tx. in Beeftink et Géhu 1973

SPA-01 *Spartinetalia glabrae* Conard 1935

Pioneer vegetation of perennial cord grasses on tidal flats of temperate seas of the World

- *Spartinetalia alterniflorae* Conard 1935 *nom. mut. propos.* (*sensu* Rivas-Martínez et al. 2011) (*mut.illeg.*)
- *Coeno-Spartinetalia* Chapman 1959 (2b)
- *Spartinetalia maritimae* Conard 1935 *corr.* Beeftink et al. in Géhu et Beeftink 1973 (*corr.superfl.*)

SPA-01A *Spartinion glabrae* Conard 1935

Pioneer vegetation of perennial cord grasses on tidal flats of temperate seas of Europe and North America

- *Eco-Spartinion* Chapman 1959 (3d)
- *Spartinion maritimae* Beeftink et Géhu 1973 (syntax.syn.)
- *Spartinion maritimae* Conard 1935 *corr.* Beeftink et al. in Géhu et Beeftink 1973 (*corr.superfl.*)
- *Spartinion anglicae* Géhu in Bensettiti et al. 2004 (2b)
- *Spartinion anglicae* Géhu in Bardat et al. 2004 (29)

THE *Therosalicornietea* Tx. in Tx. et Oberd. 1958

Pioneer vegetation of annual succulent halophytes on tidal mud flats and edges of the irregularly flooded saline inland waters of Eurasia

the01 As reported by Dengler et al. (2004: 351), this class was published in Tüxen & Oberdorfer (1958: 24) under the name '*Thero-Salicornietea strictae* Tx. 1954'. Since the reference to 'Tx. 1954' does not refer to a separate publication, but to the year in which the excursion reported in the book took place, the correct author citation should read: '*Thero-Salicornietea* Tx. in Tx. et Oberd. 1958'. Since the

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authors did not make reference to the (subclass) *Thero-Salicornienea* Pignatti 1953, neither the citation of Pignatti (1953) in brackets nor the omission of the epithet '*strictae*' (both suggested by Mucina 1997: 127) would apply. (JD, LM)

- *Salicornietea* Br.-Bl. et Tx. 1943 (2b)
- *Cakileto-Therosalicornietea* Pignatti 1952 p.p. (orig.form) (2b)
- *Cakileto-Therosalicornietea* Pignatti 1953 p.p. (orig.form) (syntax.syn.)
- *Salicornietea strictae* Tx. 1954 (phantom)
- *Thero-Salicornietea strictae* Tx. 1954 (phantom)
- *Thero-Salicornietea* Tx. 1955 (orig.form) (2b)
- *Thero-Salicornietea* Tx. in Tx. et Oberd. 1958 (orig.form)
- *Coeno-Salicornietea* Tx. 1968 (phantom)
- *Thero-Suaedetea* Rivas-Mart. 1972 (orig.form) (syntax. syn.)
- *Thero-Suaedetea* Vicherek 1973 (31)
- *Salicornietea strictae* Tx. 1974 (phantom)
- *Thero-Salicornietea strictae* Tx. 1974 (phantom)
- *Thero-Salicornietea* Tx. ex Géhu et Géhu-Franck 1984 (orig.form) (31)
- *Salicornietea europaeae* (Tx. in Tx. et Oberd. 1958) Julve 1993 (29)

THE-01 *Therosalicornietalia* Pignatti 1952

Pioneer vegetation of annual succulent halophytes of tidal mud flats and edges of the irregularly flooded saline inland waters of the Mediterranean, and temperate, boreal and subarctic Europe

the02 The order '*Therosalicornietalia*' was validly published in Pignatti (1952b). In this publication, the order contains two validly published alliances. One of the alliances is the '*Therosalicornion*' with one validly published association, the *Halopeplidetum amplexicaulis*. A direct reference to the valid protologue of the *Halopeplidetum amplexicaulis* described by Burollet (1927), was made by Pignatti (1952b: 85). Since Pignatti (1952b) also cited Braun-Blanquet (1933), it is clear that his '*Therosalicornion*' refers actually to the '*Thero-Salicornion*' of Braun-Blanquet (1933). Here we designate the *Thero-Salicornion* Br.-Bl. 1933 as the *lectotypus* of the *Thero-Salicornietalia* Pignatti 1952. (LM) Rivas-Martínez et al. (2001) proposed the '*Thero-Salicornietalia Pignatti 1953'* as a *nomen ambiguum* (ICPN art. 36) and to use the name *Thero-Suaedetalia* Br.-Bl. et Bolòs 1958 instead. (JPT)

- *Salicornietalia* Br.-Bl. et Tx. 1943 (2b)
- *Therosalicornietalia* Pignatti 1953 (orig.form) (31)
- *Salicornietalia strictae* Tx. 1954 (phantom)
- *Thero-Salicornietalia strictae* Tx. 1954 (orig.form) (phantom)
- *Thero-Salicornietalia strictae* Tx. in Tx. et Oberd. 1958 (orig.form) (3f)
- *Thero-Suaedetalia* Br.-Bl. et O. de Bolòs 1958 (orig.form) (syntax.syn.)
- *Coeno-Salicornietalia* Chapman 1959 p.p. (3d)
- *Salicornietalia strictae* Tx. 1974 (phantom)
- *Thero-Salicornietalia* Tx. ex Géhu et Géhu-Franck 1984 (orig.form)
- *Salicornietalia europaeae* (Pignatti 1953) Marchiori et Medagli 2008 (29)

THE-01A *Therosalicornion* Br.-Bl. 1933

Mediterranean and thermo-atlantic pioneer vegetation of annual succulent plants of tidal flats and irregularly flooded inland depressions

the03 This name, validly described by Braun-Blanquet (1933: 12), was lectotypified by the *Salsolo sodae-Suaedetum splendentis* Br.-Bl. 1933 by Polte in Dengler et al. (2004: 351). (LM) Rivas-Martínez et al. (2001) proposed the name *Thero-Salicornion* Br.-Bl. 1933 to be considered a *nomen ambiguum* (ICPN art. 36) and to use the name *Thero-Suaedion* Br.-Bl. in Br.-Bl. et al. 1952, instead. (JPT)

- *Thero-Suaedion* Br.-Bl. 1931 (orig.form) (2b)
- *Thero-Suaedion* Br.-Bl. in Br.-Bl. et al. 1952 (orig.form) (29)

the04 Braun-Blanquet et al. (1952: 102) validated this name as was originally suggested (as *nomen nudum*) by Braun-Blanquet (1931). These authors, however, cited the validly described *Thero-Salicornion* Br.-Bl. 1933 in the synonymy, rendering the *Thero-Suaedion* Br.-Bl. ex Br-Bl. et al. 1952 a *nomen superfluum* (IPCN art. 29). Here we select the '*Suaedeto-Kochietum hirsutae* Br.-Bl. 1931' as the *lectotypus* of this alliance. Géhu (1994) suggested that this alliance be classified in the *Euphorbietalia peplidis* (*Cakiletea maritimae*). (LM)

- *Therosalicornion* (Br.-Bl. 1933) Pignatti 1953 (29c)
- *Thero-Salicornion* (Br.-Bl. 1933) Tx. 1954 (phantom)
- *Salicornion* Chapman 1959 (2b)
- *Suaedion* Chapman 1959 (2b)
- *Salicornion strictae* Tx. 1974 (phantom)
- *Salicornion patulae* Géhu et Géhu-Franck 1984 (syntax. syn.)
- *Salicornion emerici* Géhu et Géhu-Franck 1984 (syntax. syn.)
- *Salicornion patulo-emerici* Rivas-Mart. 1984 (3b)
- *Suaedion splendentis* Julve 1993

THE-01B *Salicornion dolichostachyo-fragilis* Géhu et Rivas-Mart. in Géhu et Géhu-Franck 1984

Atlantic annual succulent pioneer vegetation of slikke of tidal mud-flats at the lower tidal mark

- *Salicornion strictae* Tx. in Tx. et Oberd. 1958 (3f)
- *Salicornion dolichostachyae* Tx. 1974 (phantom)
- *Salicornion oliveri-procumbentis* Géhu et Géhu-Franck 1982 (2b, 5)

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- *Salicornion dolichostachyo-fragilis* Géhu et Géhu-Franck 1982 (2b, 5)
- *Salicornion dolichostachyo-fragilis* Géhu et Rivas-Mart.1982 (2b, 5)
- *Salicornion dolichostachyo-fragilis* Géhu et Rivas-Mart. in Géhu 1992 (31)
- *Salicornion europaeae* Schubert et al. 1995 (phantom)
- *Thero-Salicornion dolichostachyae* (Tx. in Tx. et Oberd. 1958) Rivas-Mart. et al. 1998 (orig.form)

THE-01C *Salicornion ramosissimae* Tx. 1974

Atlantic annual succulent pioneer vegetation of schorre tidal mud-flats at the upper tidal mark

- *Salicornion ramosissimae* Tx. ex Rivas-Mart. et al. 1980 (31)
- *Salicornion ramosissimae* Tx. ex W. Matuszkiewicz 1981 (31)
- *Salicornion europaeo-ramosissimae* Géhu et Géhu-Franck 1984 (syntax.syn.)

THE-02 *Camphorosmo-Salicornietalia* Borhidi 1996

Eurasian subcontinental-continental hypersaline vegetation dominated by annual succulents on solonchak and solonetz soils of inland salt pans

the05 The name *Camphorosmo-Salicornietalia* Borhidi 1996 was typified in the protologue (Borhidi 1996) by the *Salicornion herbaceae* Soó 1933. If/when the latter is recognized as a *nomen ambiguum*, the *Camphorosmo-Salicornietalia* would be deemed invalid and in need of re-typification. (LM)

GROUP OF ALLIANCES ON SOLONCHAK SOILS

THE-02A *Salicornion prostratae* Géhu 1992

Pannonian vegetation of annual succulent halophytes on solonchak soils in temporarily wet inland salt-pans

the06 The use of the name *Salicornia prostrata* (see Adler et al. 1994; Fischer et al. 2005) suggests that this taxonomic concept is conceptually synonymous with *Salicornia perennans* Willd. (Kadereit et al. 2012). *S. prostrata* is an illegitimate name (Kadereit et al. 2012). If/when the *Salicornion herbaceae* Soó 1933 is recognized as a *nomen ambiguum*, this name will become the oldest valid current name for this syntaxonomic contents. (LM)

- *Salicornion herbaceae* Soó 1933 *nom. ambig. rejic. propos.* (36)

the07 Salicornia herbacea L. is a *nomen illegitimum* considered to be a heterotypic synonym of *Salicornia europaea* L. The taxonomic understanding of *S. europaea* is subject to various interpretations. The name *Salicornia prostrata* was used to name the *Salicornia* taxon in Austria, Hungary and the Czech Republic (see for instance Géhu 1992; Šumberová in Chytrý 2007). The latest taxonomic and nomenclatural studies (Kadereit et al. 2007, 2012) have shown that most of the inland *Salicornia* populations of the Eastern Europe should be classified as *Salicornia perennans*. The oldest name for this alliance is the '*Salicornion herbaceae* Soó 1933', which could be corrected (ICPN art. 44) to the '*Salicornion europaeae* Soó 1933'. This step would however, create major confusion because of the identical taxon names used before this for different syntaxa. Because the *Salicornia europaea* L. is taxonomically considered as a different taxon to *S. perennans* Willd. (Kadereit et al. 2012), we suggest (supported by Šumberová in Chytrý 2007: 145) that the name *Salicornion herbaceae* Soó 1933 be rejected as *nomen ambiguum*. (LM)

- *Thero-Suaedion* Vicherek 1973 (31)

the08 Although the name *Thero-Suaedion* Vicherek 1973 was validly published, it cannot be used as the current name for the syntaxonomic concept originally called '*Salicornion herbaceae* Soó 1933' (in case that both alliances are considered syntaxonomically identical). The *Thero-Suaedion* Vicherek 1973 is a later homonym of the *Thero-Suaedion* Br.-Bl. in Br.-Bl. et al. 1952 and a syntaxonomic synonym of the *Thero-Salicornion*. (LM)

- *Salicornion prostratae* Soó 1933 *corr*. Borhidi 1996 (31, *corr.superfl.*)
- *Salicornion prostratae* Sanda et al. 1999 (31)

THE-02B *Suaedion acuminatae* Golub et Tsorbadze in Golub 1995 *corr.* Lysenko et Mucina 2015

Sarmatian vegetation of annual succulent halophytes on solonchak soils of temporarily wet inland salt pans

- *Suaedion salsae* Golub et Tchorbadze 1988 (1)
- *Suaedion salsae* Golub et Tchorbadze in Golub 1995 (43)

THE-02C *Microcnemion coralloidis* Rivas-Mart. et Géhu in Rivas-Mart. 1984

Iberian inland vegetation of annual succulent halophytes on solonchak soils of temporarily wet inland salt pans

GROUP OF ALLIANCES ON SOLONETZ SOILS

THE-02D *Thero-Camphorosmion annuae* Vicherek 1973

Hypersaline annual chenopod communities on solonetz soils in the Pannonian Basin and the Central Balkans

THE-02E *Camphorosmo songoricae-Suaedion corniculatae* Freitag et al. 2001

Hypersaline annual chenopod communities on solonetz soils of the Caspian region and northwestern Siberia

JUN *Juncetea maritimi* Br.-Bl. in Br.-Bl. et al. 1952

Perennial grasslands and herb-rich vegetation of coastal and inland salt-marshes and sea-cliffs of the Mediterranean Sea and the Atlantic and Arctic Oceans

- *Juncetea maritimi* Br.-Bl. 1931 (phantom)
- *Astero-Salicornietea* Westhoff et al. 1942 (3b)
- *Puccinellietea phryganodis* Hadač 1946 (phantom)
- *Juncetea maritimi* Tx. et Oberd. 1958 (31)
- *Asteretea tripolii* Westhoff et Beeftink in Beeftink 1962 (syntax.syn.)

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- *Carici-Puccinellietea phryganodis* Knapp 1964 (phantom)
- *Agropyretea pungentis* Géhu 1968 (syntax.syn.)

jun01 Rivas-Martínez et al. (2011: 238) consider the *Agropyretea pungentis* Géhu 1968 as synonymous to the *Artemisietea vulgaris*, a decision that is not supported by any other regional or national surveys. (LM)

- *Agropyretea pungentis* Géhu et J. Géhu 1969 (31)
- *Plantagini-Triglochinetea* Géhu et Tx. in Géhu et Géhu-Franck 1992

JUN-01 *Juncetalia maritimi* Br.-Bl. ex Horvatić 1934

Mediterranean and thermo-atlantic tall-rush saline wetland vegetation

- *Juncetalia maritimi* Br.-Bl. 1931 p.p. (2b)
- *Juncetalia maritimi* Br.-Bl. in Br.-Bl. et al. 1952 (31)
- *Caricetalia extensae* Pignatti 1953 (syntax.syn.)
- *Coeno-Halojuncetalia* Chapman 1954 (2b)
- *Juncetalia maritimi* Br.-Bl. ex Tx et Oberd. 1958 (31)
- *Coeno-Juncetalia* Chapman 1959 (2b)
- *Carici-Juncetalia gerradi* (Pignatti 1953) Passarge 1978 (29)

GROUP OF ALLIANCE OF TIDAL SALT-MARSHES

JUN-01A *Juncion maritimi* Br.-Bl. ex Horvatić 1934

Mediterranean and thermo-atlantic coastal saline rush marsh vegetation under a prolonged flooding regime

- *Juncion maritimi* Br.-Bl. 1931 (2b)
- *Juncion maritimi* Br.-Bl. in Br.-Bl. et al. 1952 (31)
- *Tetragonolobion siliquosi* Pignatti 1953 (syntax.syn.)
- *Eco-Juncion maritimi* Chapman 1954 (2b)
- *Juncion maritimi* Chapman 1959 (2b)
- *Apio-Juncion maritimi* Pop 1962
- *Apio-Juncion maritimi* Rivas Goday et Rivas-Mart. 1963
- *Glauco maritimae-Juncion maritimi* Géhu et Géhu-Franck 1984 (2b)
- *Puccinellion festuciformis* Géhu et Scoppola in Géhu et al. 1984 (31)

jun02 This name is a later homonym of the *Puccinellion convolutae* Mitsevski 1965. (LM)

- *Inulion crithmoidis* S. Brullo et Furnari 1988 (syntax.syn.)
- *Limonio gmelinii-Juncion maritimi* Golub et V. Solomakha 1988
- *Glauco maritimae-Juncion maritimi* Géhu 2007 (syntax. syn.)

JUN-01B *Frankenio laevis-Armerion maritimae* Géhu et Géhu-Franck 1975

Vegetation of upper tidal nutrient-rich sandy coastal flats of the Cantabro-Atlantic region of the Iberian Peninsula and Southern France

jun03 Here I designate the *Limonietum lychnidifolio-dodartii* (Géhu & Géhu-Franck 1975: Tab. 2) as the *lectotypus* of the *Frankenio laevis-Armerion maritimae*. (LM)

- *Limonio ovalifolii-Frankenion laevis* Rivas-Mart. et al. 2001 (2b)
- *Limonio ovalifolii-Frankenion laevis* Arbesú, Bueno et Fernández Prieto in Rivas-Mart. et al. 2002 (syntax. syn.)

jun04 Some authors (e.g. Bueno Sánchez 1997) classify this vegetation within the *Salicornietea fruticosae*. (LM)

GROUP OF ALLIANCE OF SALINE DUNE SLACKS

JUN-01C *Plantaginion crassifoliae* Br.-Bl. in Br.-Bl. et al. 1952

Western Tyrrhenian and Provencal saline swards of margins of lagoons and damp dune-slacks

- *Plantaginion crassifoliae* Br.-Bl. 1931 (2b)
- *Schoenion ferruginei* Rivas Goday 1945 (2b)

JUN-01D *Limonion etrusci* Viciani et al. 2012

Saline swards in temporary damp dune-slacks of the Tuscan Tyrrhenian seaboards

JUN-01E *Agropyro-Plantaginion maritimi* Horvatić 1934

Central and Eastern Mediterranean saline swards of margins of lagoons and damp dune-slacks

- *Schoenion litorale* Pignatti 1953 (34a)

JUN-02 *Agropyretalia pungentis* Géhu 1968

Halo-nitrophilous grasslands of salt-sprayed sandy-loamy shores of the winter-mild atlantic and mediterranean regions of Europe

jun05 The syntaxonomic content of this unit is very contentious as it had been classified as a class in its own right (*Agropyretea pungentis:* Géhu 1968) or recognized only as an alliance (*Elytrigion athericae*), classified into the '*Elytrigietalia repentis*' and the *Artemisietea vulgaris* (Rivas-Martínez et al. 2002a, 2002b: 473). The latter suggestion is more difficult to follow than the former. (LM) According to KD this order is weakly differentiated and would be better included within the '*Glauco-Puccinellietalia*' (*recte*: *Puccinellio maritimae-Salicornietalia*).

- *Elytrigietalia pungentis* Géhu 1968 *nom. mut. propos.* (45)
- *Agropyretalia athericae* Géhu 1968 *nom. mut. propos.* (45)

jun06 Rivas-Martínez et al. (2002a: 259) formally suggested this name change. (LM)

- *Elytrigietalia pungentis* Géhu et J. Géhu 1969 *nom. mut. propos.* (45)
- *Agropyretalia pycnanthi* Géhu 1968 *corr*. Díaz González et Fernández Prieto 1994 (30, *corr.illeg.*)
- *Agropyretalia pycnanthi* Géhu 1968 *corr*. Herrera 1995 (30, *corr.illeg.*)

JUN-02A *Agropyrion pungentis* Géhu 1968

Halo-nitrophilous grasslands of salt-sprayed sandy-loamy shores of thermo-atlantic Europe

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jun07 This alliance is weakly differentiated and would be better included into the *Festucion maritimae*. (KD) Classification of this alliance within the *Agropyretalia intermedio-repentis* by Rivas-Martínez et al. (2011: 240) is not warranted. (LM)

- *Trifolion maritimi* Chapman 1959 (2b)
- *Elytrigion pungentis* Géhu 1968 *nom. mut. propos.* (*mut.illeg.*)
- *Elytrigion athericae* Géhu 1968 *nom. mut. propos.* (*mut.illeg.*)

jun08 Published proposals to mutate this name or illegitimate use in its mutated form were published for instance by Julve (1993: 43), Géhu (1999: 30) and Rivas-Martínez et al. (2011: 240). (LM)

- *Elymion pycnanthi* Géhu 1968 *nom. mut. propos.* (*mut.illeg.*)
- *Elytrigion pungentis* Géhu et J. Géhu 1969 *nom. mut. propos.* (45)
- *Agropyrion pycnanthi* Géhu 1968 *corr.* Díaz González et Fernández Prieto 1994 (*corr.illeg.*)
- *Agropyrion pycnanthi* Géhu 1968 *corr.* Herrera 1995 (*corr.illeg.*)
- *Brachypodio pinnati-Agropyrion pungentis* Bioret et al. 2004 (2b)

JUN-02B *Agrostio-Elytrigion athericae* S. Brullo et Siracusa 2000

Halo-nitrophilous grasslands of salt-sprayed sandy-loamy coastal slopes of the Mediterranean

jun09 Brullo & Siracusa (2000) described this unit from Sicily (Etna) and classified it within the *Phragmitetalia.* (JPT)

JUN-02C *Agropyro-Artemision coerulescentis* Pignatti 1953

Tyrrhenian-Adriatic (sub)halo-nitrophilous salt-sprayed grassy scrub of the edges of coastal lagoons

- *Agropyro pycnanthi-Artemision coerulescentis* Pignatti 1953 *nom. mut. propos.* (45)
- *Elytrigio-Artemision coerulescentis* Pignatti 1953 *nom. mut. propos.* (45)

JUN-03 *Puccinellio maritimae-Salicornietalia* Br.-Bl. et De Leeuw 1936

Vegetation of saline swards of the edges of salt-marshes in the temperate and boreal zones of Europe

jun10 An informal suggestion to consider this name as *nomen ambiguum* was presented by Rivas-Martínez et al. (2011: 202) but without detail for the argument. This proposal lacks substance since the concerned syntaxon was validly described and the only confusion might have originated from its occasional placement within the *Thero-Salicornietea*. (LM)

- *Juncetalia maritimi* Br.-Bl. 1931 p.p. (2b)
- *Junco bothnici-Triglochinetalia* Christiansen 1933
- *Salicornio-Puccinellietalia maritimae* Br.-Bl. et De Leeuw 1936 *nom. invers. propos.* (42)

jun11 The proposal to invert the name *Puccinellio-Salicornietalia* (as well as *Puccinellio-Salicornion*) is based on the fact that these communities are dominated by perennial herbs (including *Puccinellia maritima*), while *Salicornia herbacea* (*recte*: *S. europaea*) is found in the stands of these communities only occasionally and with low cover. The mutation of this name further recognizes the fact that the name *Salicornia herbacea* has been replaced by *S. europaea* in modern floras in the past 20 years. (LM)

- *Junco-Caricetalia* Corillion 1953
- *Coeno-Festucetalia* Chapman 1959 p.p. (3d)
- *Coeno-Puccinellietalia* Chapman 1959 p.p. (3d)
- *Glauco-Puccinellietalia* Beeftink et Westhoff in Beeftink 1965 (29)
- *Cirsietalia esculenti* Mirkin et Golub in Golub et V. Solomakha 1988 *nom. dubium* (38)
- *Armerio-Juncetalia gerradi* Passarge 1999

JUN-03A *Festucion maritimae* Christiansen 1927

Vegetation of grass-rich saline swards at low tide mark of the European Atlantic coasts

- *Puccinellion maritimae* Christiansen 1927 *nom. mut. propos.* (*mut.illeg.*)

jun12 The proposal to correct (mutate) this name was handled by the Nomenclature Commission (Willner et al. 2011), which suggested rejection of the proposal. (LM)

- *Puccinellio maritimae-Salicornion herbaceae* Br.-Bl. et De Leeuw 1936 (syntax.syn.)

jun13 This name is considered as a *nomen dubium* by Rivas-Martínez et al. (2011) yet without presenting a convincing explanation as to why. Of the two associations assigned to this alliance in the protologue (Braun-Blanquet & De Leeuw 1936: 371–373) only the *Puccinellietum maritimae* Br.-Bl. et De Leeuw 1936 is validly described, hence becoming automatically the *holotypus* of the *Puccinellio maritimae-Salicornion herbaceae* Br.-Bl. et De Leeuw 1936. (LM)

- *Puccinellion retroflexae* Iversen 1936
- *Puccinellion maritimae* Tx. 1937 (31)
- *Eco-Festucion maritimae* Chapman 1959 (3d)
- *Eco-Puccinellion* Chapman 1959 p.p. (3d)
- *Halimionion* Chapman 1959 (2b)
- *Glauco-Caricion dilutae* Golub et V. Solomakha 1988 (syntax.syn.)
- *Puccinellio maritimae-Halimionion portulacoidis* Géhu 1994 (2b, 5)
- *Puccinellio maritimae-Halimionion portulacoidis* Géhu et Biondi 1995

JUN-03B *Puccinellio maritimae-Spergularion salinae* Beeftink 1965

Vegetation of grass-rich saline swards of hypersaline supratidal habitats of the European Atlantic coasts

JUN-03C *Armerion maritimae* Br.-Bl. et De Leeuw 1936

Vegetation of grass- and chamaephyte-rich saline swards at high tide mark of the Atlantic seaboards of Europe

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- *Festucion arenariae* Corillion 1953
- *Junco-Caricion* Corillion 1953 (syntax.syn.)
- *Eco-Armerion* Chapman 1959 (3d)
- *Festucion littoralis* Corillion 1953 *corr.* Géhu 1976 (*corr.superfl.*)
- *Eleocharition uniglumis* Krisch 1990

JUN-04 *Puccinellietalia phryganodis* Hadač 1946

Boreo-arctic coastal salt-marsh saline swards on the shores of the North Atlantic and Arctic Oceans

jun14 This order is weakly differentiated and should be included into the *Glauco-Puccinellietalia*. (KD)

- *Coeno-Puccinellietalia* Chapman 1959 p.p. (3d)
- *Carici-Puccinellietalia phryganodis* (Hadač 1946) Knapp 1964 (29)
- *Carici-Puccinellietalia phryganodis* Beeftink et Westhoff in Beeftink 1965

JUN-04A *Puccinellion phryganodis* Hadač 1946

Boreo-arctic coastal lower-marsh saline swards on the shores of the North Atlantic and Arctic Oceans

- *Boreo-Puccinellion* Pignatti 1953 (syntax.syn.)
- *Puccinellion phryganodis* Nordhagen 1954 (31)
- *Eco-Puccinellion* Chapman 1959 p.p. (3d)
- *Juncion atrofuscae* Golub et al. 2003 (3b)
- *Triglochino maritimi-Fucion vesiculosae* Golub et al. 2003 (3b)

JUN-04B *Caricion glareosae* Nordhagen 1954

Boreo-arctic coastal upper-marsh saline swards on the shores of the North Atlantic and Arctic Oceans

- *Magnocaricion glareosae* Shimwell 1973 (orig.form) (2b)

JUN-04C *Dupontion fischeri* Hadač 1946

Arctic subsaline coastal peaty meadows on clayey soils of Svalbard and Greenland

SAL *Salicornietea fruticosae* Br.-Bl. et Tx. ex A. Bolòs y Vayreda et O. de Bolòs in A. Bolòs y Vayreda 1950

Mediterranean and thermo-atlantic perennial salt-marsh herblands and scrub

sal01 The correct citation for the authority of the names published in the book Vegetación de la comarcas Barcelonesas by Antonio Bolòs y Vayreda (1950) is 'A. Bolòs et O. de Bolòs in A. Bolòs 1950'. Indeed, the contribution of O. de Bolòs is clearly acknowledged (1) in the subtitle of the book ('Descripción geobotánica y catálogo florístico, según estudios efectuados por el proprio autor y por Oriol de Bolòs y Capdevilla'), and (2) in the introduction where A. Bolòs acknowledged that O. de Bolòs contributed importantly with phytosociological and floristical results and their interpretation ("*Hay que hacer constar que se han aprovechado para la elaboración del presente trabajo los resultados de estudios fitosociológicos y florísticos de Oriol de Bolòs y Capdevila, los cuales constituyen una parte importante del total de datos e interpretaciones que se publican en este libro.*"). (JPT)

- *Puccinellio-Salicornietea* Ţopa 1939 p.p. (3f)

sal02 Šumberová in Chytrý (2007: 150) suggested rejecting the *Puccinellio-Salicornietea* Ţopa 1939 *nomen ambiguum*. This step appears as superfluous since the name is invalid. (LM)

- *Salicornietea* Br.-Bl. et Tx. 1943 (2b)
- *Sarcocornietea futicosae* Br.-Bl. et Tx. ex A. Bolòs y Vayreda 1950 *nom. mut. propos.* (orig.form) (*mut.superfl.*)

sal03 Rivas-Martínez et al. (2002a: 277) formally suggested this name change. The proposed *nomina mutata* for this class (*Sarcocornietea fruticosae*), order (*Sarcocornietalia fruticosae*) and for one of the alliances (*Sarcocornion fruticosae*) might not be acceptable since it has been ascertained that the genus *Sarcocornia* is paraphyletic to *Salicornia* (Kadereit et al. 2007). This should eventually lead, following the principles of monophyly, to recognition of the genus *Salicornia* as including also current species classified as *Sarcocornia.* (LM)

- *Puccinellio-Salicornietea* Ţopa ex Pignatti 1953 (syntax. syn.)
- *Salicornietea* Br.-Bl. et Tx. in Br.-Bl. et al.1952 (31)

sal04 Braun-Blanquet et al. (1952) validated the invalidly described '*Salicornietea* Br.-Bl. et Tx. 1943' and classified two validly published orders within this class *(Salicornietalia* and *Juncetalia maritimi*). The former name (*Salicornietalia* Br.-Bl. ex Br.-Bl. et al. 1952) is the *lectotypus* of the *Salicornietea* Br.-Bl. ex Br.-Bl. et al. 1952). (LM)

- *Salicornietea fruticosae* Br.-Bl. in Tx. et Oberd. 1958 (31)
- *Arthrocnemetea fruticosi* Br.-Bl. et Tx. 1943 *corr.* O. de Bolòs 1967 (orig.form) (5)

sal05 This name 'correction' (de Bolòs 1967) is in fact a mutation (*nomen mutatum*). It cannot be followed based on current knowledge of evolutionary relationships and the systematics of the genera within the tribe *Salicorniae.* Kadereit et al. (2006) demonstrated that the name-giving taxon of this syntaxon (originally described as *Salicornia fruticosa*) cannot be classified within *Arthrocnemum* because it should be considered an evolutionary entity (genus) clearly separated from the *Salicornia/Sarcocornia* alliance. (LM)

SAL-01 *Salicornietalia fruticosae* Br.-Bl. 1933

Mediterranean and thermo-atlantic halophilous coastal tidal and inland temporarily flooded succulent chenopod scrub

sal06 Braun-Blanquet (1933: 12–23) validly published the name *Salicornietalia* (with three validly published alliances: *Thero-Salicornion*, *Salicornion fruticosae* and *Staticion gallo-provincialis nom. illeg.*). The name *Salicornietalia* has not been (to our knowledge) typified as yet. In order to follow in the tradition of the majority of phytosociological literature regarding this type of vegetation, we shall use the

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name *Salicornietalia* Br.-Bl. 1933 for the perennial chenopod-dominated saline scrub and herewith typify the *Salicornietalia* Br.-Bl. 1933 by selecting the *Salicornion fruticosae* Br.-Bl. 1933 as its type (*lectotypus hoc loco;* Braun-Blanquet 1933: 15). (LM)

- *Salicornietalia fruticosae* Br.-Bl. 1931 (2b)
- *Sarcocornietalia fruticosae* Br.-Bl. 1933 *nom. mut. propos.* (*mut.superfl.*)

sal07 Rivas-Martínez et al. (2002a: 277) formally suggested this name change; but see Remarks *sal03* and *sal04.* (LM)

- *Limonieto-Salicornietalia* Pignatti 1952 (orig.form) (syntax.syn.)
- *Limonio-Salicornietalia* Pignatti 1953 (31)
- *Coeno-Salicornietalia* Chapman 1959 p.p. (3d)
- *Arthrocnemetalia fruticosi* Br.-Bl. 1931 *corr.* O. de Bolòs 1967 (2b)

SAL-01A *Salicornion fruticosae* Br.-Bl. 1933

Mediterranean and thermo-atlantic intertidal succulent dwarf chenopod scrub

- *Salicornion fruticosae* Br.-Bl. 1931 (2b)
- *Sarcocornion fruticosae* Br.-Bl. 1933 *nom. mut. propos.* (*mut.superfl.*)

sal08 Rivas-Martínez et al. (2002a: 277) formally suggested this name change; but see Remarks *sal03* and *sal04.* (LM)

- *Salicornion fruticosae* Br.-Bl. in Br.-Bl. et al. 1952 (31)
- *Halo-Puccinellion* Pignatti 1952 (syntax.syn.)
- *Halo-Puccinellion* Pignatti 1953 (31)
- *Eco-Fruti-Salicornion* Chapman 1954 (3d)
- *Arthrocnemion fruticosi* Br.-Bl. 1931 *corr.* O. de Bolòs 1967 (2b)
- *Halimionion portulacoidis* Géhu 1976 (syntax.syn.)
- *Sarcocornion perennis* S. Brullo et Furnari 1988 (syntax. syn.)
- *Puccinellio maritimae-Halimionion portulacoidis* Géhu et Biondi 1995
- *Arthrocnemion perennis* (Rivas-Mart. in Rivas-Mart. et al. 1980) Golub et al. 2001 (31)

SAL-01B *Arthrocnemion glauci* Rivas-Mart. et Costa M. 1984

Mediterranean hypersaline coastal supratidal succulent chenopod scrub on sandy and rocky soils

- *Staticion orientale* Oberd. 1952 (34a)

sal09 Here we designate 'Die *Arthrocnemum glaucum-Halocnemum strobilaceum*-Association' (see Oberdorfer 1952: 338) as the nomenclature type of the *Staticion orientale*. This selection results from consideration of the *Staticion orientale* as a synonym of the *Salicornion fruticosae* Br.-Bl. 1933. (LM)

- *Limonion orientale* Oberd. 1952 *nom. mut. propos.* (34a, *mut.superfl.*)
- *Arthrocnemion macrostachyi* Rivas-Mart. et M. Costa 1984 *nom. mut. propos.* (45)

sal10 Rivas-Martínez et al. (2002a: 249) formally suggested this name change. (LM)

- *Halocnemion strobilacei* Korzhenevskii et Kliukin 1990 (1)
- *Halocnemion strobilacei* Korzhenevskii et Kliukin in Korzhenevskii 2000 (syntax.syn.)
- *Sarcocornion alpini* (Rivas-Mart. et al. 1990) S. Brullo et al. 2002 (syntax.syn.)
- *Halocnemion strobilacei* Biondi et al. 2013 (31)

SAL-01C *Suaedion brevifoliae* Br.-Bl. et O. de Bolòs 1958

Mediterranean and Cantabro-Atlantic subnitrophilous supratidal succulent chenopod scrub on loamy-sandy soils

sal11 Suaeda brevifolia Moq., used in the protologue as the eponymous species of this name, is considered in modern nomenclature (see www.emplant.org) as *Suaeda vera* var. *brevifolia* (Moq.) Rivas-Martínez and therefore should be included within the variability of *Suaeda vera* J.F. Gmelin. (LM)

- *Suaedion verae* S. Brullo et Furnari 1988 (syntax.syn.)
- *Suaedion braun-blanqueti* Br.-Bl. et O. de Bolòs 1958 *corr.* Rivas-Mart. et al. 1991 (*corr.superfl.*)

sal12 The correction of the name *Suaedion brevifolia*e in Rivas-Martínez et al. (1991) appears to be irrelevant since *Suaeda vera* subsp. *braun-blanquetii* is no longer considered to be a different taxon to *S. vera* J.F. Gmelin subsp. *vera.* (LM, JPT)

- *Atriplici halimi-Suaedion verae* Julve 1993 (5)
- *Suaedion verae* (Rivas-Mart. et al. 1990) Rivas-Mart. et al.1999 (31)
- *Sarcocornion alpini* (Rivas-Mart. et al. 1991) S. Brullo et al. 2002 (syntax.syn.)

SAL-02 *Limonietalia* Br.-Bl. et O. de Bolòs 1958

Western and Central Mediterranean sea-lavender herblands of saline rarely flooded retrodunal depressions and on elevated edges of inland salt pans

- *Limonietalia* Br.-Bl. et O. de Bolòs 1957 (phantom)

IBERIAN GROUP OF ALLIANCES

SAL-02A *Lygeo-Lepidion cardaminis* Rivas Goday et Rivas-Mart. in Rivas-Mart. et M. Costa 1984

Central Iberian mesomediterranean saline vegetation on the edges of inland salt pans

- *Lygeo-Lepidion cardaminis* Rivas Goday et Rivas-Mart. 1963 (2b)

SAL-02B *Lygeo sparti-Limonion furfuracei* Rigual 1972

Murcian-Almerian coastal and inland thermo-mesomediterranean semiarid saline dwarf sea-lavender scrub

- *Lygeo-Limonion angustibracteati* Alcaraz et al. 1988 (2b)

SAL-02C *Limonion catalaunico-viciosoi* Rivas-Mart. et M. Costa 1984

Mesomediterranean saline vegetation on the edges of inland saltpans of the Ebro River valley

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SAL-02D *Limonion algarvensi-lanceolati* J.C. Costa et al. 2012
Lusitanian-Andalusian thermomediterranean upper-tidal saline marsh vegetation of rosulate and prostrate chamaephytes

TYRRHENIAN-CENTRAL MEDITERRANEAN GROUP OF ALLIANCES
SAL-02E *Limonion confusi* (Br.-Bl. 1933) Rivas-Mart. et M. Costa 1984
Provencal thermomediterranean coastal saline dwarf sea-lavender scrub
- *Staticion galloprovincialis* Br.-Bl. 1931 (2b)
- *Staticion galloprovincialis* Br.-Bl. 1933 (34a)
- *Limonion galloprovincialis* Br.-Bl. 1933 *nom. mut. propos.* (34a, *mut.illeg.*)
- *Eu-Staticion* Rothmaler 1943 (34b)
- *Limonion virgati* (Br.-Bl. 1933) Julve 1993 (29)

SAL-02F *Triglochino barrelieri-Limonion glomerati* Biondi et al. 2001
Sardinian thermomediterranean coastal saline dwarf sea-lavender scrub

SAL-03 *Limoniastrietalia guoynoniani* Guinochet 1951
Sea-lavender hypersaline scrub in supratidal non-inundated sandy habitats of the semi-desert regions of the Southern Mediterranean islands and North Africa
sal13 I suggest that this order is validly published because it was based on the validly published *Limonion guoynoniani* Guinochet 1951, encompassing two validly published associations in the protologue. Barbagallo et al. (1990: 595) claimed that both associations are 'heterogeneous' and hence not published validly, an argument difficult to follow due to the apparently personal interpretational bias. The *Limoniastrietalia guoynoniani* Guinochet 1951 is widely distributed in North Africa (where some more alliances have been described, e.g. the *Limonion pruinosi* S. Brullo et Furnari 1988) and in the Middle East. The *Limoniastrietalia guoynoniani* reach marginal areas of the dry coastal regions of Southern Europe. A detailed syntaxonomic scheme, including also syntaxa described from North Africa, was presented in Géhu (1988). (LM)
- *Halocnemetalia cruciati* Biondi et al. 2013 (syntax.syn.)

SAL-03A *Limoniastrion monopetali* Pignatti 1952
Sea-lavender hypersaline scrub in supratidal non-inundated sandy habitats of the Western and Central Mediterranean and North Africa
sal14 Alternatively, this alliance could be classified within the *Pegano-Salsoletea*. (EB)
- *Limoniastrion monopetali* Pignatti 1953 (31)
- *Limonion ferulacei* (Pignatti 1952) Beeftink 1968 (31)

sal15 Beeftink (1968) cited Pignatti (1953) as the paper in which the '*Limonion ferulacei*' was described at the suballiance level. This syntaxon was described for the first time by Pignatti (1952b). (LM)
- *Frankenion thymifoliae* Barbagallo et al. 1990 (29)

SAL-03B *Halocnemion cruciati* Biondi et al. 2013
Hypersaline chenopod supratidal scrub of arid and hyperarid marginal regions of the Mediterranean

FRESHWATER AQUATIC VEGETATION

LEM *Lemnetea* O. de Bolòs et Masclans 1955
Free-floating duckweed vegetation of still and relatively nutrient-rich freshwater bodies of the Holarctic
- *Lemnetea* Tx. 1953 (phantom)
- *Lemnetea minoris* Koch et Tx. 1954 (phantom)
- *Lemnetea* Tx. 1955 (2b)
- *Lemnetea gibbae* Oberd. 1956 (phantom)
- *Lemnetea* Koch et Tx. in Oberd. 1957 (31)
- *Ceratophylletea* Den Hartog et Segal 1964 (2b)
- *Stratiotetea* Den Hartog et Segal 1964 (syntax.syn.)
- *Hydrocharitetea morsus-ranae* Oberd. et al. 1967 (2b, 3b)
- *Hydrocharito-Lemnetea* Oberd. et al. 1967 (2b, 3b)
- *Hydrocharito-Lemnetea* Soó 1968 (2b)
- *Lemno-Potametea* De Lange 1972 p.p. (1)
- *Utricularo-Stratiotetea* Géhu et Bournique 1987 (2b)

LEM-01 *Lemnetalia minoris* O. de Bolòs et Masclans 1955
Vegetation of free-floating vegetation of still and relatively nutrient-rich freshwater bodies of temperate Europe
lem01 The classification of the *Lemnion minoris, Utricularion vulgaris* and *Hydrocharition morsus-ranae* into the *Lemnetalia* and *Lemnetea* follows the traditions of the Central European phytosociology (Schratt 1993; Oťahelová in Valachovič 2001; Šumberová in Chytrý 2011), although some authors (Rivas-Martínez et al. 2001; Matuszkiewicz 2007) prefer to classify the *Utricularion vulgaris* and the *Hydrocharition morsus-ranae* into the *Potamogetonetea.* (LM, MC) According to Berg et al. (2001, 2004), this order can be split into three floristically and ecologically distinct alliances, namely the *Lemnion minoris s.str.*, the *Lemnion trisulcae* (presently listed as a syntaxonomic synonym of the *Lemnion minoris*), and the *Hydrocharition morsus-ranae*. (JD)
- *Hydrocharitetalia* Rübel 1933 (2b)
- *Lemnetalia minoris* Koch et Tx. 1954 (phantom)
- *Lemnetalia* Tx. 1955 (2b)
- *Lemnetalia gibbae* Oberd. 1956 (phantom)
- *Lemnetalia* Koch et Tx. in Oberd. 1957 (31)
- *Ceratophylletalia* Den Hartog et Segal 1964 (2b)
- *Stratiotetalia* Den Hartog et Segal 1964 (syntax.syn.)
- *Utricularietalia* Den Hartog et Segal 1964 (syntax.syn.)

lem02 This order has been also classified within the *Potamogetonetea* (Rivas-Martínez et al. 2011). (LM)

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- *Lemno-Potametalia* De Lange 1972 p.p. (1)
- *Lemno-Utricularietalia* Passarge 1977 (phantom)
- *Lemnetalia minoris* Tx. in Schwabe et Tx. 1981

LEM-01A *Lemnion minoris* O. de Bolòs et Masclans 1955

Vegetation of free-floating duckweed vegetation of still and relatively nutrient-rich freshwater bodies of the temperate Europe

lem03 See Remark *lem01*.

- *Lemnion* Koch et Tx. 1954 (phantom)
- *Lemnion* Koch et Tx. in Oberd. 1957 (31)
- *Lemnion minoris* Tx. 1955 (2b)
- *Lemnion gibbae* Oberd. 1956 (phantom)
- *Lemno-Salvinion natantis* Slavnić 1956 (syntax.syn.)
- *Lemnion trisulcae* Den Hartog et Segal 1964 (syntax.syn.)

lem04 Alternatively, the *Lemnion trisulcae* could be separated from the *Lemnion minoris*. It is floristically quite well defined and ecologically distinct, as it prefers less eutrophic water bodies with lower intensity of disturbances than the *Lemnion minoris* communities. The *Lemnion trisulcae* appears to be floristically and ecologically close to the *Utricularion* with which it could be united in one alliance carrying the oldest valid name, the *Lemnion trisulcae*. (JD, KS)

- *Azollo-Salvinion* Passarge 1964 (phantom)
- *Lemnion gibbae* Tx. et Schwabe in Tx. 1974 (syntax.syn.)

lem05 This alliance (originally coined to accommodate the Mediterranean floating duckweed communities) is sometimes recognized as a separate syntaxon. (JPT)

- *Riccio-Lemnion trisulcae* (Den Hartog et Segal 1964) Tx. et Schwabe-Braun in Tx. 1974 (phantom)
- *Azollo-Salvinion* Passarge 1978 (2b)
- *Lemno-Riccion* Passarge 1977 (phantom)
- *Riccio-Lemnion trisulcae* Schwabe-Braun in Tx. 1981 (29)

LEM-01B *Utricularion vulgaris* Passarge 1964

Vegetation of free-floating bladderworts in mesotrophic and eutrophic waters of Europe

- *Utricularion* Den Hartog et Segal 1964 (33)

LEM-01C *Stratiotion* Den Hartog et Segal 1964

Vegetation of free-floating macrophytes in fairly nutrient-rich shallow waters of Europe

- *Ceratophyllion demersi* Soó 1927 (2b)
- *Hydrocharition* Rübel 1933 (2b)
- *Hydrocharition morsus-ranae* Rübel ex Klika 1944 (orig.form) (*sensu* Royer et al. 2006) (2b)
- *Ceratophyllion demersi* Den Hartog et Segal 1964 (2b)
- *Eu-Hydrocharition* Passarge 1964 (34b)
- *Hydrocharition morsus-ranae* (Passarge 1964) Westhoff et Den Held 1969 (syntax.syn.)
- *Ceratophyllion demersi* Den Hartog et Segal ex Passarge 1996 (syntax.syn.)

lem06 This alliance should be included into the *Potamogetonion*. (KD)

- *Lemno minoris-Hydrocharition morsus-ranae* Rivas-Mart. et al. 1999 (29)
- *Lemno minoris-Hydrocharition morsus-ranae* Rodwell et al. 2002 (*sensu* Chifu et al. 2006) (2b, 5)

POT *Potamogetonetea* Klika in Klika et Novák 1941

Vegetation of rooted floating or submerged macrophytes of stagnant mesotrophic, eutrophic and brackish freshwater bodies and slowly flowing shallow streams of Eurasia

pot01 Although the IPCN allows the use of shorter forms (*Potametea, Potametalia, Potamion*) of the names derived from the genus *Potamogeton*, we see no reason why this particular genus should receive special treatment and therefore prefer using names conforming to the general rules of name creation as dictated by ICPN. (KD, LM)

- *Potametetales* Klika in Klika et Novák 1941 (orig.form) (41b)
- *Potamogetonetea pectinati* Klika in Klika et Novák 1941 (10c, 40)
- *Potametea* (Narayanayga 1928) Tx. 1942 (orig.form) (*sensu* Westhoff et al. 1946) (phantom)
- *Potametea* Tx. et Preising 1942 (orig.form) (1)
- *Nymphaeetea* Klika in Klika et Hadač 1944 (2b)
- *Potametea* Tx. ex Westhoff et al. 1946 (orig.form) (31)
- *Potametea* Tx. et Preising in Oberd. 1957 (orig.form) (31)
- *Charo-Potametea* Kępczyński et Ceynowa-Gieldon 1972 p.p. (phantom)
- *Lemno-Potametea* De Lange 1972 p.p. (orig.form) (1)
- *Trapetea* Wiegleb 1982 (2b)
- *Potametea colorati* Wiegleb 1982 (2b)
- *Potametea cutifolii* Wiegleb 1982 (2b)
- *Callitrichetea stagnalis* Wiegleb 1982 (2b)
- *Ranunculetea hederacei* Wiegleb 1982 (2b)

POT-01 *Potamogetonetalia* Koch 1926

Vegetation of rooted floating or submerged macrophytes of mesotrophic and eutrophic freshwater bodies of Eurasia

- *Potamogetonetalia pectinati* Koch 1926 (Rec.10, 40)
- *Potametalia* Br.-Bl. 1931 (orig.form) (2b)
- *Luronio-Potametalia* Den Hartog et Segal 1964 (orig.form) (3f)
- *Magnopotametalia* Den Hartog et Segal 1964 (orig.form) (syntax.syn.)
- *Parvopotametalia* Den Hartog et Segal 1964 (orig.form) (syntax.syn.)
- *Trapetalia* Segal 1965 (3b)
- *Luronio-Potametalia* Den Hartog et Segal ex Westhoff et Den Held 1969 (syntax.syn.)
- *Luronio-Potamogetonetalia polygonifolii* (Den Hartog et Segal 1964) Rivas-Mart. 1973 (29)
- *Potamogetonetalia crispi* (Den Hartog et Segal 1964) Rivas-Mart. 1973 (29)

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- *Potamogetonetalia lucentis* (Den Hartog et Segal 1964) Rivas-Mart. 1973 (29)
- *Nymphaeetalia* Passarge 1978 (syntax.syn.)
- *Nymphaeetalia albo-tetragonae* Passarge 1978 (Rec.10, 40)
- *Ranunculetalia* Schmidt 1981 (syntax.syn.)
- *Nupharo-Potametalia* Schaminée et al. 1990 (orig.form) (5)
- *Ranunculo-Myriophylletalia* Passarge 1996 (Passarge 1996a; see References below) (3b)
- *Ranunculo-Myriophylletalia* Passarge 1996 (Passarge 1996b; see References below) (2b)

ALLIANCES OF FRESHWATER NUTRIENT-RICH WATER BODIES

POT-01A *Potamogetonion* Libbert 1931

Vegetation of rooted and floating macrophytes of freshwater bodies at low and mid-altitudes of temperate Eurasia

- *Potamion eurosibiricum* Koch 1926 (orig.form) (34a)
- *Potamion eurosibiricum* Br.-Bl. 1931 (orig.form) (2b)
- *Potamion* Miljan 1933 (orig.form) (31)
- *Potamion eurosibiricum* Nordhagen 1936 (phantom)
- *Potamion eurosibiricum* Nordhagen 1937 (orig.form) (2b, 34a)
- *Potamion lucentis* Vollmar 1947 (phantom)
- *Potamion pusilli* Vollmar 1947 (phantom)
- *Magno-Potamion eurosibiricum* Vollmar 1947 (orig.form) (34a)
- *Eu-Potamion* (Koch 1926) Oberd. 1957 (orig.form) (29, 34b)
- *Potamogetonion pectinati* Koch 1926 em. Oberd. 1957 (phantom)
- *Magnopotamion* (Vollmar 1947) Den Hartog et Segal 1964 (orig.form) (syntax.syn.)
- *Magnopotamogetonion lucentis* (Vollmar 1947) Den Hartog et Segal 1964 (*sensu* Passarge 1996a) (Rec.10, 40)
- *Potamogetonion pusilli* (Vollmar 1947) Den Hartog et Segal 1964 (phantom)
- *Trapion natantis* Segal 1965 (syntax.syn.)
- *Elodeion* De Lange 1972 (1)
- *Potamogetonion crispi* (Den Hartog et Segal 1964) Rivas-Mart. 1973 (29)
- *Potamogetonion lucentis* (Den Hartog et Segal 1964) Rivas-Mart. 1973 (29)
- *Potamion lutescentis* (Koch 1926) Rivas-Mart. 1973 (orig.form) (*sensu* Costa et al. 2012) (phantom)
- *Potamion natantis* Lakušić 1975 (orig.form) (2b)
- *Potamion perfoliati* Lakušić 1975 (orig.form) (2b)
- *Potamogetonion pectinati* Koch 1926 *corr*. Görs in Oberd. et al. 1977 (phantom)
- *Potamion pusilli* Hejný in Hejný et Husák 1978 (syntax. syn.)
- *Potamion pusilli* Wiegleb 1982 (2b, 5)
- *Potamion pusilli* Wiegleb ex Vahle in Preising et al. 1990 (orig.form) (3f)
- *Ranunculo-Myriophyllion* Passarge 1992 (3g)
- *Potamogetonion pusilli* (Koch 1926) Julve 1993 (3b)
- *Elodeo-Potamion crispi* Passarge 1996 (orig.form) (8)
- *Potamogetonion natanto-obtusifolii* Passarge 1996 (syntax. syn.)

POT-01B *Nymphaeion albae* Oberd. 1957

Vegetation of rooted floating-leaf macrophytes of sheltered nutrient-rich freshwaters of Western and Central Europe

- *Parvo-Potamion eurosibiricum* Vollmar 1947 (orig.form) (34a)
- *Parvopotamion* (Vollmar 1947) Den Hartog et Segal 1964 (orig.form) (29c)
- *Nymphoidion peltatae* Passarge 1992 (syntax.syn.)
- *Utricularion minoris-Nymphaeion candidae* Vahle in Preising et al. 2012 (29c)

POT-01C *Nelumbion nuciferae* Losev et Golub in Golub et al. ex Mucina et Theurillat in Theurillat et al. 2015

Vegetation of rooted floating-leaf macrophytes of sheltered nutrient-rich freshwater bodies of southeastern Europe and Asia

- *Nelumbion nuciferae* Losev et Golub in Golub, Losev et Mirkin 1991 (2b)
- *Nelumbion nuciferae* Losev et Golub ex Golub et Lifirenko 2015 (5)

ALLIANCES OF FRESHWATER NUTRIENT-POOR WATER BODIES

POT-01D *Potamogetonion graminei* Westhoff et Den Held 1969

Vegetation of rooted macrophytes of nutrient-poor shallow freshwaters at mid-altitudes of Europe

pot02 The *Potamogetonion graminei* should be included within the *Littorellion.* (KD)

- *Potamion polygonifolii* Den Hartog et Segal 1964 (orig.form) (3f)
- *Potamion alpini* Lakušić 1975 (orig.form) (2b)
- *Junco-Potamion polygonifolii* Passarge 1996 (orig.form) (syntax.syn.)

POT-01E *Ranunculion confervoidis* Béguin et Theurillat *ined.*

Vegetation of rooted macrophytes of cold nutrient-poor waters of shallow lakes in the upper subalpine and alpine belts of the Alps

POT-02 *Callitricho hamulatae-Ranunculetalia aquatilis* Passarge ex Theurillat in Theurillat et al. 2015

Vegetation of crosswort, crowfoot and milfoil rooted macrophytes in shallow and intermittent freshwater streams of Europe

- *Callitricho-Batrachietalia* Den Hartog et Segal 1964 (phantom)
- *Callitricho-Batrachietalia* Den Hartog et Segal ex Passarge 1978 (2b)

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- *Callitricho-Potametalia* Schipper et al. 1990 (orig.form) (3b)
- *Callitricho-Potametalia* Schipper, Lanjouw et Schaminée 1995 (2b)

POT-02A *Batrachion fluitantis* Neuhäusl 1959

Vegetation of crowfoot and milfoil rooted macrophytes in shallow moving freshwaters of Europe

- *Ranunculion fluitantis* Neuhäusl 1959 (30, *mut.illeg.*)
- *Callitricho-Batrachion* Den Hartog et Segal 1964 (29c)
- *Hottonion* Den Hartog et Segal 1964 (orig.form) (corresp.; as suballiance) (2b)
- *Hottonion* Segal 1964 (phantom)
- *Hottonion* Segal 1965 (syntax.syn.)

POT-02B *Ranunculion aquatilis* Passarge ex Theurillat in Theurillat et al. 2015

Vegetation of crosswort rooted macrophytes in shallow stagnant freshwaters of temperate Europe

- *Ranunculion aquatilis* Passarge 1964 (3f)
- *Batrachion aquatilis* Passarge 1964 *nom. mut. propos.* (*mut.illeg.*)
- *Ranunculion peltati* Schaminée et al. 1990 (2b)
- *Lemno-Callitrichion* Passarge 1992 (3g)
- *Ranunculion peltati* Schipper et al. 1995 (5)

POT-02C *Ranunculion omiophyllo-hederacei* Rivas-Mart. et al. 2002

Vegetation of stoloniferous helophytes in muddy water-springs in the meso- to oromediterranean belts of the Western Mediterranean

pot03 The protologue of this alliance contains two associations, the *Montio amporitanae-Ranunculetum hederacei* and the *Myosotido stoloniferae-Ranunculetum omiophylli,* both showing more similarities to the *Potamogetonetea* (*Callitricho-Ranunculetalia*) than to the *Montio-Cardaminetea,* whereto this alliance has been classified by its authors (e.g. Rivas-Martínez et al. 2011). The syntaxonomic relationship to the *Ranunculion aquatilis* remains unclear and therefore, we maintain the alliance status of this unit. (KS, LM)

POT-03 *Zannichellietalia pedicellatae* Schaminée, Lanjouw et Schipper ex Mucina et Theurillat *ined.*

Vegetation of rooted macrophytes in meso-eutrophic brackish waters of Western and Central Europe

- *Zannichellietalia pedicellatae* Schaminée, Lanjouw et Schipper 1990 (2b)
- *Zannichellietalia pedicellatae* Rodwell et al. 2002 (2b, 5)

POT-03A *Zannichellion pedicellatae* Schaminée, Lanjouw et Schipper ex Passarge 1996

Vegetation of rooted macrophytes in meso-eutrophic brackish waters of Western and Central Europe

- *Zannichellion pedunculatae* Segal 1963 (1)
- *Najadion marinae* Lakušić 1975 (2b)
- *Najadion* Passarge 1978 (2b)
- *Zannichellion palustris* Passarge 1978 (2b)
- *Zannichellion pedicellatae* Schaminée et al. 1990 (2b)
- *Zannichellion pedicellatae* Schipper et al. 1995 (5)

VEGETATION OF FRESHWATER SPRINGS, SHORELINES AND SWAMPS

MON *Montio-Cardaminetea* Br.-Bl. et Tx. ex Klika et Hadač 1944

Vegetation of water springs of Europe, the European Arctic archipelagos and Greenland

- *Montio-Cardaminetea* Br.-Bl. et Tx. 1943 (2b)
- *Montio-Cardaminetea* Br.-Bl. et Tx. in Br.-Bl. 1948 (31)
- *Montio-Cardaminetea* Br.-Bl. et Tx. ex Klika 1948 (31)
- *Montio-Cardaminetea* Br.-Bl. et Tx. in Br.-Bl. et al. 1952 (31)
- *Aconito-Cardaminetea* Hadač 1956 p.p. (35)

MON-01 *Cardamino-Chrysosplenietalia* Hinterlang 1992

Vegetation of soft-water springs in shady forest habitats in the submontane and montane belts of the Central European mountains

mon01 This order should be included in the *Montio-Cardaminetalia.* (KD)

- *Cardamino-Caricetalia remotae* Kästner 1941 (2b)

MON-01A *Caricion remotae* Kästner 1941

Vegetation of soft-water springs in shady forest habitats in the submontane and montane belts of Central European mountains

- *Caricion remotae* Kästner 1940 (phantom)
- *Cardaminion* Maas 1959 (syntax.syn.)
- *Ranunculo repentis-Impatiention noli-tangere* Passarge 1967 (29c)

mon02 The only valid association in the protologue of the *Ranunculo-Impatiention* (Passarge 1967) is the *Caricetum remotae* Kästner 1941, which is also the *holotypus* of the *Caricion remotae* Kästner 1941. (LM, JPT)

MON-02 *Montio-Cardaminetalia* Pawłowski et al. 1928

Vegetation of cold oligotrophic water-springs in the nemoral to arctic zones and in the oromediterranean belt of Europe

- *Epilobietalia alsinifolii* Nordhagen 1936 (phantom)
- *Epilobietalia alsinifolii* Nordhagen 1937 (2b)
- *Cardamino-Cratoneuretalia* Maas 1959 (syntax.syn.)
- *Cratoneuro-Philonotidetalia* Geissler 1976 (2b, 3b)

BOREO-TEMPERATE GROUP OF ALLIANCES

MON-02A *Mniobryo-Epilobion hornemannii* Nordhagen 1943

• *Vegetation of cold oligotrophic water-springs in the boreal and Arctic zones of Northern Europe and Greenland*

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- *Montio-Epilobion hornemannii* Nordhagen 1936 (phantom)
- *Montio-Epilobion hornemannii* Nordhagen 1937 (2b)
- *Anthelion julaceae* Shimwell 1972 (syntax.syn.)
- *Cardamino nymanii-Saxifragion foliolosae* Hadač 1989 (syntax.syn.)

MON-02B *Koenigio-Microjuncion* (Sörensen 1942) Hadač 1971

Vegetation of clayey and sandy-clayey flats around water springs and on shores of lakes of the Arctic zone of Iceland and Greenland

mon03 The syntaxonomy of this unit is contentious and the possibility of its placement within the *Isoëto-Nanojuncetea* cannot be excluded. (LM)

- *Koenigio-Microjuncion* (*arcticum*) Sörensen 1942 (orig.form) (34a)

MON-02C *Cardamino-Montion* Br.-Bl. 1926

Vegetation of cold oligothrophic water springs in the subalpine and alpine belts of mountains of Central and southwestern Europe

mon04 Hájková & Hájek (in Chytrý 2011: 604) suggested rejecting this name as a *nomen ambiguum*. (LM)

- *Montio-Cardaminion* Pawłowski et al. 1928 (31)
- *Montion* Maas 1959 (29)

mon05 Hájková & Hájek (in Chytrý 2011: 603) suggested rejecting this name as a *nomen ambiguum*. (LM)

MON-02D *Swertio perennis-Anisothecion squarrosi* Hadač 1983

Vegetation of cold oligotrophic water springs in the supramontane and montane belts of Central Europe

- *Cratoneuro filicini-Calthion laetae* Hadač 1983 (syntax.syn.)
- *Swertio perennis-Dichodontion squarrosi* Hadač 1983 *nom. mut. propos.* (45)

mon06 The formal proposal to this effect was published by Hájková & Hájek (in Chytrý 2011: 603). (LM)

- *Philonotidion seriatae* Hinterlang 1992 (syntax.syn.)

MON-02E *Epilobio nutantis-Montion* Zechmeister in Zechmeister et Mucina 1994

Vegetation of oligotrophic water-springs in the submontane and montane belts of mountains of Western Europe

- *Epilobio nutantis-Montion* Zechmeister 1993 (2b, 5)

MON-02F *Cratoneurion commutati* Koch 1928

Vegetation of moss-rich calcareous water springs in the montane and subalpine belts of Europe and Greenland

mon07 The position of the *Cratoneurion commutati* is marginal in this class and it would perhaps be better placed in the *Adiantetea.* (KD)

- *Palustriellion commutatae* Koch 1928 *nom. mut. propos.* (45)

mon08 Rivas-Martínez et al. (2002a: 270) formally suggested this name change. (LM)

- *Cratoneuro-Saxifragion aizoidis* Nordhagen 1936 (phantom)
- *Cratoneuro-Saxifragion aizoidis* Nordhagen 1937 (2b)
- *Endocarpion* Br.-Bl. 1948 (2b)
- *Cochlearion alpinae* Br.-Bl. in Br.-Bl. et Tx. 1952
- *Arabidion jacquinii* Julve 1993 (2b, 3b)
- *Cochlearion pyrenaicae* Bardat in Bensettiti et al. 2002 (2b, 3b)
- *Cochlearion pyrenaicae* Bardat in Bardat et al. 2004 (2b, 3b)

MON-02G *Lycopodo europaei-Cratoneurion commutati* Hadač 1983

Vegetation of moss-rich calcareous water springs in the colline and submontane belts of Central Europe

mon09 This alliance should be reduced to synonymy with the *Cratoneurion commutati*. (KD)

- *Pellion endiviifoliae* Bardat in Bensettiti et al. 2002 (2b)
- *Pellion endiviifoliae* Bardat in Bardat et al. 2004 (2b, 3b)
- *Riccardio pinguis-Eucladion verticillati* Bardat in Bensettiti et al. 2002 (2b)
- *Riccardio pinguis-Eucladion verticillati* Bardat in Bardat et al. 2004 (2b, 3b)

MERIDIONALE GROUP OF ALLIANCES

MON-02H *Myosotidion stoloniferae* Rivas-Mart. et al. 1984

Oroiberian and Western Orocantabrian vegetation of oligotrophic water springs of the Iberian Peninsula

MON-02I *Pinguiculo balcanicae-Cardaminion acris* Čarni et Matevski 2010

Vegetation of the oligotrophic water springs in the subalpine zone of the Central and Southern Balkan mountain ranges

- *Heliospermo-Saxifragion stellaris* Redžić 2000 (2b, 5)

LIT *Littorelletea uniflorae* Br.-Bl. et Tx. ex Westhoff et al. 1946

Hairgrass swards and bladderwort vegetation in oligotrophic and mesotrophic waters of Eurasia

- *Isoëto-Littorelletea* Br.-Bl. et Vlieger in Vlieger 1937 p.p. (35)

lit01 The use of the name '*Isoëto-Littorelletea* Br.-Bl. et Vlieger in Vlieger 1937' (e.g. by Mucina 1997) is not in accordance with the ICPN art. 35. In the protologue of the *Isoëto-Littorelletea* (Vlieger 1937) there are two orders validly described: the *Isoëtalia* Br.-Bl. ex Vlieger 1937 (= *Nano-Cyperetalia* Klika 1935) and the *Littorelletalia* Koch ex Vlieger 1937 (= *Littorelletalia* Koch ex Tx. 1937). These two orders have been frequently (as well as are this syntaxonomic system) classified into two different classes, the *Isoëto-Nanojuncetea* and the *Littorelletea.* (JD, LM)

- *Littorelletea uniflorae* Br.-Bl. et Tx. 1943 (2b)
- *Littorelletea uniflorae* Tx. 1947 (31)
- *Utricularietea* Den Hartog et Segal 1964 (syntax.syn.)

lit02 The *Utricularia*-dominated communities sharing the *Littorelletea* ecology, were previously classified within a

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class in their own right – the *Utricularietea.* Šumberová et al. (in Chytrý 2011: 269) listed the relevant literature sources. (LM) Berg et al. (2004) synonymized this class with the *Lemnetea.* (JD)

- *Utricularietea intermedio-minoris* Pietsch 1965 (2b, 32a)
- *Isoëtetea* Pietsch 1966
- *Juncetea bulbosi* Tx. et Dierßen 1972 (syntax.syn.)

LIT-01 *Littorelletalia uniflorae* Koch ex Tx. 1937

Hairgrass swards and bladderwort vegetation in oligotrophic and mesotrophic waters of Eurasia

- *Littorelletalia uniflorae* Koch 1926 (2b)
- *Utricularietalia* Den Hartog et Segal 1964 (syntax.syn.)
- *Utricularietalia intermedio-minoris* Pietsch 1965 (2b)
- *Juncetalia bulbosi* Pietsch 1971 (1)
- *Eleocharitetalia multicaulis* de Foucault 2010 (syntax.syn.)

lit03 We do not recognize the *Eleocharitetalia multicaulis* (supposed to be characteristic for Atlantic regions of Europe) as an order in its own right because of the following reasons: (1) both verbal diagnosis as well as tabular distinction (see de Foucault 2010a: Tab. 1) between the *Eleocharitetalia multicaulis* and the *Littorelletalia* are not convincing, and (2) there is a clear decrease of the number of *Littorelletea* communities from the oceanic towards continental regions, reflecting an impoverishment trend in regional species pools. However, there is no replacement of the oceanic by continental species, as one would expect in the case of two geographically defined orders. (KS, LM)

BOREO-ARCTIC AND ALPINE GROUP OF ALLIANCES

LIT-01A *Subularion aquaticae* Hadač 1971

Dwarf-herb amphibious vegetation on the edges of glacial lakes of the high mountains of Central and southeastern Europe, oceanic boreo-subarctic Northern Europe and Greenland

- *Isoëtion lacustris* Nordhagen 1936 (2b)
- *Isoëtion lacustris* Nordhagen 1937 (phantom)
- *Subulario-Isoëtion* Pietsch 1977 (29)

lit04 This unit comprises (according to Pietsch 1977) the invalidly published *Isoëtion lacustris* Nordhagen 1937 and validly described *Subularion* Hadač 1971) and therefore is a *nomen superfluum* of the latter. (LM)

- *Subulario aquaticae-Isoëtion echinospori* Pietsch 1977 *corr.* Rivas-Mart. et Navarro in Navarro 1987 (10c, 40)

LIT-01B *Rorippion islandicae* Béguin et Theurillat *ined.*

Pioneer vegetation on cryoturbated loamy-sandy edges of high-altitude shallow oligotrophic glacial lakes inundated by snow-melt of the Alps

lit05 The alliance is awaiting formal description. For the ecology and distribution of this vegetation see Béguin (2011). (LM)

LIT-01C *Deschampsion litoralis* Oberd. et Dierßen in Dierßen 1975

Pioneer vegetation of dry upper littoral of large low-altitude glacial lakes of the northern and southern rims of the Alps

TEMPERATE GROUP OF ALLIANCES

LIT-01D *Lobelion dortmannae* Vanden Berghen 1964

Temperate-boreal amphibious Lobelia and Isoëtes communities in nutrient-poor standing waters of the Atlantic regions of Europe

- *Littorellion uniflorae* Koch ex Tx. 1937 (31)
- *Lobelio dortmannae-Isoëtion* Pietsch 1965 (phantom)
- *Lobelio-Isoëtion* Pietsch 1966 (syntax.syn.)
- *Myriophyllo alternifolii-Lobelion dortmannae* Tx. et Dierßen in Dierßen 1972 (1)
- *Ranunculion reptantis* Tx. et al. in Dierßen 1972 (1)

LIT-01E *Littorellion uniflorae* Koch ex Klika 1935

Vegetation of amphibious plants in fluctuating shallow oligo-mesotrophic waters of temperate and boreal Europe

- *Littorellion uniflorae* Koch 1926 (2b)
- *Littorellion uniflorae* Malcuit 1929 (2b)
- *Littorellion* Sauer 1937 (2b)
- *Elatino-Eleocharition acicularis* Pietsch 1965 (phantom)
- *Eleocharition acicularis* Pietsch 1965 (phantom)
- *Eleocharition acicularis* Pietsch 1966 (2b)
- *Eleocharition acicularis* Pietsch 1967 (phantom)
- *Apio-Pilularion globuliferae* Schoof-van Pelt 1973 (phantom)

lit06 Pietsch (1977) described as a new sub-alliance under the name '*Apio-Pilularion globuliferae* (Schoof-van Pelt 1973) *suball. nov.*' There is however, no '*Apio-Pilularion*' mentioned by Schoof-van Pelt (1973) either at alliance or suballiance level. The latter author used the name '*Eleocharition acicularis* Pietsch 1965'. (KS, LM)

- *Eleocharition acicularis* Pietsch ex Dierßen 1975 (29)
- *Eu-Littorellion uniflorae* (Koch 1926) Pietsch 1977 (2b)

LIT-01F *Hyperico elodis-Sparganion* Br.-Bl. et Tx. ex Oberd. 1957

Vegetation of amphibious plants in shallow mesotrophic waters on peaty substrates in atlantic regions of Europe

- *Helodo-Sparganion* Br.-Bl. et Tx. 1943 (orig.form) (2b)
- *Elodo palustris-Sparganion* Br.-Bl. et Tx. ex Oberd. 1957 (30)
- *Hypericion elodis* T. Müller et Görs 1960 (3b)
- *Hyperico-Juncion bulbosi* Segal 1968 (phantom)
- *Juncion bulbosi* Segal 1968 (phantom)
- *Eleocharition multicaulis* Vanden Berghen 1969 (syntax. syn.)
- *Hyperico-Juncion bulbosi* Pietsch 1971 (1)
- *Littorello-Eleocharition multicaulis* Sjögren 1973 (syntax. syn.)
- *Hydrocotylo vulgaris-Baldellion ranunculoidis* Tx. et Dierßen in Dierßen 1973 (*sensu* Rivas-Mart. et al. 2011: 179) (phantom)

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- *Hydrocotylo vulgaris-Baldellion ranunculoidis* Tx. et Dierßen in Dierßen 1975 (syntax.syn.)
- *Samolo valerandi-Baldellion ranunculoidis* Schaminée et Westhoff in Schaminée et al. 1992 (syntax.syn.)
- *Samolo-Baldellion* Schaminée et Westhoff ex Pott 1992 (2b)
- *Baldellion repentis* (Schaminée et Westhoff in Schaminée et al. 1992) Pietsch 1995 (29)

LIT-01G *Sphagno-Utricularion* T. Müller et Görs 1960

Vegetation dominated by bladderwort and peat-moss in oligotrophic and dystrophic peaty water pools of Europe

- *Utricularion* Den Hartog et Segal 1964 (syntax.syn.)

LIT-01H *Scorpidio-Utricularion minoris* Pietsch 1965

Vegetation dominated by bladderwort and peat-moss in neutral-reaction peaty water pools of Europe

- *Utricularion intermedio-minoris* Passarge 1978 (2b)
- *Utricularion intermedio-minoris* (T. Müller et Görs 1960) Julve 1993 (2b, 3b)

ISO *Isoëto-Nanojuncetea* Br.-Bl. et Tx. in Br.-Bl. et al. 1952

Pioneer ephemeral dwarf-cyperaceous vegetation in periodically freshwater flooded habitats of Eurasia

- *Isoëto-Littorelletea* Br.-Bl. et Vlieger in Vlieger 1937 p.p. (35)
- *Isoëto-Nanojuncetea* Br.-Bl. et Tx. 1943 (2b)
- *Isoëto-Nanojuncetea* Br.-Bl. et Tx. ex Westhoff et al. 1946 (3b)
- *Isoëto durieui-Juncetea bufonii* Br.-Bl. & Tx. ex Westhoff et al. 1946 (*sensu* Gigante et al. 2013) (phantom)
- *Isoëto durieui-Juncetea bufonii* Br.-Bl. et Tx. in Br.-Bl. et al. 1952 (12, 29)
- *Isoëtetea velatae* de Foucault 1988 (syntax.syn.)
- *Juncetea bufonii* de Foucault 1988 (29)
- *Serapiadetea linguae* de Foucault 1999 (phantom)
- *Serapiadetea linguae* de Foucault 2001 (3b)
- *Serapiadetea cordigero-linguae* de Foucault 2012 (syntax. syn.)

ISO-01 *Isoëtetalia* Br.-Bl. 1935

Pioneer ephemeral dwarf-herb vegetation on periodically flooded soils of the Mediterranean

- *Isoëtetalia* Br.-Bl. 1931 (2b)
- *Isoëtetalia* Br.-Bl. 1936 (31)
- *Cyperetalia orientalis* Müller-Stoll et Pietsch in T. Müller 1963 (2b, 3b)
- *Isoëtetalia velatae* Br.-Bl. 1935 *corr.* Rivas Goday 1970 (phantom)
- *Isoëtetalia velatae* (Br.-Bl. 1936) de Foucault 1988 (29)
- *Isoëtetalia durieui* Br.-Bl. 1935 *corr.* O. de Bolòs et al. 1990 (40a, *corr.illeg.*)
- *Serapiadetalia cordigero-linguae* de Foucault 2012 (syntax.syn.)

ISO-01A *Isoëtion* Br.-Bl. 1935

Pioneer ephemeral quillwort vegetation of temporary pools and seaonally wet depressions of the Mediterranean

- *Isoëtion* Br.-Bl. 1931 (2b)
- *Isoëtion* Br.-Bl. 1936 (31)
- *Isoëtion velatae* Br.-Bl. 1935 *corr.* Rivas Goday 1970 (phantom)
- *Antinorio agrostideae-Isoëtion velatae* (Br.-Bl. 1936) de Foucault 1988 (29)
- *Crassulo vaillantii-Lythrion borysthenici* de Foucault 1988 (syntax.syn.)
- *Ophioglosso lusitanici-Isoëtion histricis* de Foucault 1988 (29)
- *Serapiadion* Aubert et Loisel 1972 (syntax.syn.)

iso01 In the original paper describing this unit, the authors (Aubert & Loisel 1972) suggested to classify this unit within the *Nanocyperetalia*,, while de Foucault et al. (2001) much later decided to coin a new class and new order (*Serapiadetea linguae* or *Serapiadetalia cordigero-linguae*, resp.) to accommodate this enigmatic vegetation type.
(LM)

- *Isoëtion durieui* Br.-Bl. 1935 *corr.* O. de Bolòs et al. 1990 (40a, *corr.illeg.*)
- *Serapiadion cordigero-linguae* de Foucault 2012 (syntax. syn.)

ISO-01B *Cicendion* (Rivas Goday in Rivas Goday et Borja 1961) Br.-Bl. 1967

Pioneer ephemeral herb-rich vegetation of oligotrophic temporarily flooded depressions of the Western Mediterranean

iso02 Brullo & Minissale (1998) classified this alliance within the temperate *Nanocyperetalia*. (LM)

- *Eu-Nanocyperion flavescentis* (Koch 1926) Rivas Goday in Rivas Goday et Borja 1961 p.p. (orig.form) (29a, 34b)
- *Cicendio-Solenopsion laurentiae* S. Brullo et Minissalle 1998 (syntax.syn.)

ISO-01C *Lythrion tribracteati* Rivas Goday et Rivas-Mart. in Rivas Goday 1970

Pioneer ephemeral herb-rich vegetation in long-lasting temporary summer pools of the inland Iberian Peninsula

- *Lythrion tribracteati* Rivas Goday et Rivas-Mart. 1963 (3b)

ISO-01D *Preslion cervinae* Br.-Bl. ex Moor 1936

Pioneer ephemeral herb-rich vegetation of temporary pools on sandy soils of the Central Mediterranean

- *Preslion cervinae* Br.-Bl. 1931 (2b)
- *Menthion cervinae* Br.-Bl. ex Moor 1936 *nom. mut. propos.* (45)

iso03 Rivas-Martínez et al. (2002a: 268) formally suggested this name change; see also Julve (1993: 91) and Costa et al. (2012: 6). (LM)

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ISO-01E *Agrostion salmanticae* Rivas Goday 1958

Pioneer ephemeral grass-rich vegetation on acid sands in hollows (vallicares) of the northwestern Iberian Peninsula

- *Pre-Isoëtion* Rivas Goday 1956 (3b)
- *Agrostion pourretii* Rivas Goday 1958 *nom. mut. propos.* (45)

iso04 Rivas-Martínez et al. (2002a: 248) formally suggested this name change; see also Amor et al. 1993: 47). (LM)

ISO-02 *Nanocyperetalia* Klika 1935

Pioneer ephemeral herb- and graminoid-rich late-season vegetation on periodically flooded soils of temperate Europe

- *Nanocypero-Polygonetalia* Koch 1926 (orig.form) (2b)
- *Cyperetalia fusci* Müller-Stoll et Pietsch in Lohmeyer et al. 1962 (2b)
- *Cyperetalia fusci* Müller-Stoll et Pietsch in T. Müller 1963 (31)
- *Cyperetalia fusci* Pietsch 1963 (29)
- *Elatino triandrae-Cyperetalia fusci* de Foucault 1988 (syntax.syn.)
- *Scirpetalia setacei* de Foucault 1988 (30, *mut.illeg.*)
- *Isolepidetalia setacei* de Foucault 1988 *nom. mut. propos.* (*mut.illeg.*)
- *Cicendietalia filiformis* Géhu 1992 (2b)
- *Myosuro-Beckmannietalia eruciformis* Shapoval 2006 (2b, 5)

ISO-02A *Nanocyperion* Koch 1926

Pioneer dwarf cyperaceous vegetation on moist calcium rich substrates of the submediterranean and Atlantic regions of Europe

iso05 The '*Nanocyperion*' Koch 1926 is a validly published name based on the *Cyperetum flavescentis* to which Koch (1926) refers the '*Juncus compressus-Parvocyperus*-Association' of Braun-Blanquet (1922). The latter is a valid name based on one relevé published by Braun-Blanquet (1922) in the Schaedae ad Floram Rhaeticam exsiccatam, 4. Lieferung, Nr. 413. The *Nanocyperion* Koch 1926 should actually be the valid name for the *Radiolion* if the '*Cyperetum flavescentis* Koch 1926' (*nomen superfluum* for the '*Junco compressi-Parvocyperetum* Braun-Blanquet 1922') was included in the latter alliance (see also Täuber & Petersen 2000). (JPT)

- *Nanocyperion* Libbert 1932 p.p (31)
- *Eu-Nanocyperion flavescentis* (Koch 1926) Rivas Goday in Rivas Goday et Borja 1961 p.p. (orig.form) (29a, 34b)
- *Peplidion portulae* Pietsch et Müller-Stoll 1974 (syntax. syn.)
- *Centaurio pulchelli-Blackstonion perfoliatae* de Foucault 1988 (3g)

ISO-02B *Radiolion linoidis* Pietsch 1973

Pioneer herb-rich vegetation in temporarily flooded nutrient-poor habitats of Central and Western Europe

- *Nanocyperion* Malcuit 1929 (31)
- *Nanocyperion* Libbert 1932 p.p. (31)
- *Radiolion linoidis* Rivas Goday 1961 (phantom)
- *Cyperion flavescentis* (W. Koch 1926) Pietsch 1973 (phantom)
- *Radiolion linoidis* Pietsch 1975 (phantom)

ISO-02C *Elatino macropodae-Damasonion alismatis* de Foucault 1988

Pioneer ephemeral herb-rich vegetation of temporary flooded mesotrophic depressions of the winter-mild submediterranean and atlantic regions of Europe

ISO-02D *Eleocharition soloniensis* Philippi 1968

Pioneer ephemeral rush-rich vegetation in temporarily flooded mesotrophic habitats of Central and Western Europe

- *Cypero-Lindernion dubiae* Müller-Stoll et Pietsch in T. Müller 1963 (2b)
- *Elatino-Eleocharition ovatae* Pietsch et Müller-Stoll 1968 (orig.form) (corresp.; as suballiance)
- *Eleocharition ovatae* Philippi 1968 *nom. mut. propos.* (45)

iso06 The formal proposal serving the mutation of the name was published by Šumberová et al. (in Chytrý 2011: 312) (LM)

- *Juncion bufonii* Philippi 1968
- *Gnaphalio-Juncion bufonii* (Philippi 1968) Passarge 1978 (29)
- *Elatino-Eleocharition ovatae* Pietsch 1973 (29)

ISO-02E *Verbenion supinae* Slavnić 1951

Pioneer ephemeral herb-rich vegetation in periodically flooded nutrient-rich habitats in the nemoral zone of Central and southeastern Europe

- *Fimbristylion dichotomae* Horvatić 1954 (syntax.syn.)
- *Myosurion minimi* Oberd. 1956 (2b)
- *Myosurion minimi* Oberd. 1957 (2b, 3b)
- *Crypsio alopecuroidis-Cyperion fusci* Pietsch 1961 (1)
- *Chlorocyperion glomerati* Müller-Stoll et Pietsch in T. Müller 1963 (2b)
- *Chlorocyperion glomerati* Pietsch in Horvatić 1963 (2b)
- *Dichostylion micheliani* Pietsch in Horvatić 1963 (2b)
- *Fimbristylion dichotomae* Müller-Stoll et Pietsch in T. Müller 1963 (2b)
- *Verbenion supinae* Müller-Stoll et Pietsch in T. Müller 1963 (2b)
- *Heleochloo-Cyperion micheliani* Pietsch et Müller-Stoll 1968 (2b)
- *Menthion pulegii* Lakušić et al. 1975 (phantom)
- *Menthion pulegii* Lakušić in Blečić et Lakušić 1976 (2b)

ISO-02F *Myosuro-Beckmannion eruciformis* Shapoval 2006

Pioneer ephemeral grass-rich vegetation in periodically flooded nutrient-rich habitats in the steppe zone of Eastern Europe

PHR *Phragmito-Magnocaricetea* Klika in Klika et Novák 1941

Reed swamp, sedge bed and herbland vegetation of freshwater or brackish water bodies and streams of Eurasia

- *Phragmito-Magnocaricetales* Klika in Klika et Novák 1941 (orig.form) (41b)

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- *Magnocarici-Phragmitetea* Klika in Klika et Novák 1941 *nom. invers. propos.* (42)
- *Phragmitetea* Tx. et Preising 1942 (syntax.syn.)
- *Phragmitetea* Br.-Bl. in Br.-Bl. et al. 1947 (2b)
- *Bolboschoenetea maritimi* Bilyk 1963 (phantom)
- *Arctophiletea fulvae* Pestryakov et Gogoleva 1989 (1)
- *Bolboschoenetea maritimi* Tx. et Vicherek in Tx. et Hülbusch 1971 (syntax.syn.)
- *Nasturtietea officinalis* Zohary 1973 (2b)
- *Glycerio-Nasturtietea officinalis* Géhu et Géhu-Franck 1987 (8)
- *Phragmito-Caricetea elatae* Klika in Klika et Novák 1941 *corr*. Trinajstić 2008 (40a, *corr.illeg*.)
- *Arctophiletea fulvae* Pestryakov et Gogoleva in Pestryakov et Okhlopkov 2013 (2b, 5)

PHR-01 *Phragmitetalia* Koch 1926

Reed swamps, sedge beds and herblands of mesotrophic and eutrophic stagnating or slowly flowing freshwater or brackish water bodies of Eurasia

- *Phragmitetalia australis* Koch 1926 *nom. mut. propos.* (45)
- *Phragmitetalia* Br.-Bl. 1931 (2b)
- *Phragmitetalia eurosibirica* Tx. et Preising 1942 (34a)
- *Phragmito-Magnocaricetalia* Klika in Klika et Hadač 1944 (phantom)
- *Eu-Phragmitetalia* (Koch 1926) Pignatti 1953 (phantom)
- *Hydro-Phragmitetalia* Succow 1974 (29)

PHR-01A *Phragmition communis* Koch 1926

Reed swamp vegetation of mesotrophic and eutrophic standing freshwater bodies or gently moving streams of boreo-temperate Eurasia

- *Phragmition australis* Koch 1926 *nom. mut. propos.* (45)

phr01 The formal proposal serving this name change has been published by Balátová-Tuláčková et al. (1993), Rivas-Martínez et al. (2002a: 443) and Šumberová et al. (in Chytrý 2011: 391). (LM)

- *Phragmition* Br.-Bl. 1931 (2b)
- *Phragmition eurosibiricum* Tx. et Preising 1942 (34a)
- *Eco-Phragmition* Chapman 1959 (3d)
- *Eu-Phragmition* (Koch 1926) Passarge 1964 (34b)
- *Phalarido-Glycerion maximae* Passarge 1964 p.p. (2b)
- *Meso-Phragmition* Succow 1974 (syntax.syn.)
- *Stachyo palustris-Phragmition* Succow 1974 (syntax.syn.)
- *Equisetion fluviatilis* V. Ranđelović 2007 (8)

PHR-01B *Typhion laxmannii* Nedelcu 1968

Subsaline reed swamp vegetation of the upper littoral of the continental lakes of Eastern and southeastern Europe

- *Typhion laxmannii* Losev et Golub 1988 (1)
- *Typhion laxmannii* Losev et Golub in Golub et al. 1991 (31)

PHR-02 *Bolboschoenetalia maritimi* Hejný in Holub et al. 1967

Meso-eutrophic brackish swamp reeds of European temperate coasts and the subcontinental inland regions of Central and Southern Europe

phr02 Some authors (e.g. Tüxen & Hülbusch 1971; Solomakha 2008) consider this vegetation different enough to be separated as a class in its own right (*Bolboschoenetea maritimi*). (LM) Alternatively, this order could be classified within the *Juncetea maritimi*. (JD)

- *Scirpetalia maritimi* Hejný in Holub et al. 1967 *nom. mut. propos.* (45)
- *Bolboschoenetalia maritimi* Hejný in Géhu 1969 (2b)
- *Bolboschoenetalia compacti* Hejný in Holub et al. 1967 *corr*. Rivas-Mart. et al. 1980 *nom. mut. propos.* (45)

phr03 Rivas-Martínez et al. (2002a: 250, 319, 370) formally suggested this name change. (LM)

- *Scirpetalia compacti* Hejný in Holub et al. 1967 *corr*. Rivas-Mart. et al. 1980 (31)
- *Scirpetalia maritimi* (Bilyk 1937) Rodwell et al. 2002 (*sensu* Chifu et al. 2006) (phantom)

PHR-02A *Scirpion maritimi* Dahl et Hadač 1941

Meso-eutrophic brackish swamp reeds of European temperate coastal regions

- *Bolboschoenion maritimi* Dahl et Hadač 1941 *nom. mut. propos.* (45)
- *Caricion paleaceae* Dahl et Hadač 1941 (phantom)
- *Magnocaricion paleaceae* Dahl et Hadač 1941 (syntax.syn.)
- *Bolboschoenion maritimi* Soó 1947 (31)
- *Eco-Phragmition* Chapman 1954 p.p. (3d)
- *Eco-Magnocaricion paleaceae* Chapman 1954 (orig.form) (3d)
- *Eleocharition uniglumis* Tyler 1969 (phantom)
- *Bolboschoenion maritimi continentale* (Soó 1945) Borhidi 1970 (34a)
- *Eleocharition uniglumis* Siira 1970
- *Halo-Scirpion* (Dahl et Hadač 1941) Den Held et Westhoff in Westhoff et Den Held 1969 (29)
- *Scirpion compacti* Dahl et Hadač 1941 *corr*. Rivas-Mart. et al. 1980 *nom. mut. propos.* (30, *mut.illeg*.)
- *Bolboschoenion compacti* Dahl et Hadač 1941 *corr*. Rivas-Mart. et al. 1980 *nom. corr. propos.* (45)

phr04 Rivas-Martínez et al. (2002a: 251) formally suggested this name change. (LM)

PHR-02B *Meliloto dentati-Bolboschoenion maritimi* Hroudová et al. 2009

Tall-rush subsaline reed communities of the continental regions of the Iberian Peninsula and the Pannonian Basin

- *Bolboschoenion* (hal.) Soó 1945 (orig.form) (2b)
- *Bolboschoenion maritimi* Soó 1947 (31)
- *Bolboschoenion compacti* (Soó 1947) Hejný in Holub et al. 1967 (phantom)

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- *Bolboschoenion maritimi continentale* (Soó 1945) Borhidi 1970 (34a)
- *Scirpion compacto-littoralis* Rivas-Mart. et al. in Cirujano 1980

phr05 The classification of the *Bolboschoenus* reeds of the continental Spanish Meseta within the *Meliloto-Bolboschoenion* is only tentative, pending taxonomic revision of the dominant *Bolbochoenus* species and syntaxonomic revision of the entire group of communities. (LM)

- *Scirpion compacto-littoralis* Rivas-Mart. et al. 1980 (5)

PHR-03 *Saccharetalia ravennae* Biondi, Blasi et Casavecchia in Biondi et al. 2014

Infra-mesomediterranean megareed beds of subsaline sandy intermittent rivers and hind dune depressions of Mediterranean Europe and North Africa

PHR-03A *Imperato cylindricae-Saccharion ravennae* Br.-Bl. et O. de Bolòs 1958

Infra-mesomediterranean megareed beds of subsaline sandy intermittent rivers and hind dune depressions of Mediterranean Europe and North Africa

- *Imperato cylindricae-Erianthion ravennae* Br.-Bl. et O. de Bolòs 1958 *nom. mut. propos.* (45)

phr06 The proposal to mutate the name of this syntaxon (see Julve 1993; Bardat et al. 2004: 70; Rivas-Martínez et al. 2011: 340) by replacing *Saccharum ravennae* (L.) Murray by *Erianthus ravennae* (L.) P. Beauv. is obsolete as the latest taxonomic studies suggest that the correct taxonomic position of this name-giving taxon is in the genus *Tripidium* – hence this taxon should be called *T. ravennae* (L.) H. Scholz (see Valdés & Scholz 2006). (LM)

PHR-04 *Magnocaricetalia* Pignatti 1953

Sedge-bed marsh vegetation of boreal and temperate Eurasia

- *Caricetalia elatae* (Pignatti 1953) Rivas-Mart. 1973 (29)
- *Magnocarici-Phragmitetalia* (Pignatti 1953) Succow 1974 (orig.form) (29)
- *Carici elatae-Phragmitetalia australis* (Pignatti 1953) Succow 1974 (phantom)
- *Scrophulario umbrosae-Caricetalia paniculatae* Koska in Dengler et al. 2004 (syntax.syn.)
- *Caricetalia elatae* Trinajstić 2008 (29)

PHR-04A *Magnocaricion elatae* Koch 1926

Sedge-bed marsh vegetation on oligotrophic to mesotrophic organic sediments of temperate Europe

- *Magnocaricion* Br.-Bl. 1931 (phantom)
- *Caricion gracilis* Neuhäusl 1959 (syntax.syn.)
- *Caricion acutae* Neuhäusl 1959 *nom. mut. propos.* (45)
- *Caricion rostratae* Neuhäusl 1959 (phantom)
- *Caricion rostratae* Bal.-Tul. 1963 (syntax.syn.)
- *Caricion elatae* (Koch 1926) Rivas-Mart. 1973 (29)
- *Acrocladio-Caricion* Succow 1974 (syntax.syn.)
- *Scorpidio-Cladion marisci* Succow 1974 (syntax.syn.)
- *Scrophulario umbrosae-Caricion paniculatae* Koska in Dengler et al. 2004 (syntax.syn.)
- *Caricion elatae* (Koch 1926) Trinajstić 2008 (29, 40a)

PHR-04B *Magnocaricion gracilis* Géhu 1961

Sedge-bed marsh vegetation on eutrophic clayey sediments in riverine habitats of temperate Europe

- *Caricion gracilis-vulpinae* Bal.-Tul. 1965 (phantom)

PHR-04C *Carici-Rumicion hydrolapathi* Passarge 1964

Herbland vegetation on non-stabilized organic substrates in mesotrophic waters of boreal and temperate Eurasia

- *Oenanthion aquaticae* Hejný ex Neuhäusl 1959 (3f)

phr07 Šumberová in Chytrý (2011: 515) suggested rejecting this name as a *nomen ambiguum*. (LM)

- *Cicution virosae* Hejný 1960 (1)
- *Cicution virosae* Hejný ex Segal in Westhoff et Den Held 1969 (syntax.syn.)
- *Cicution virosae* Hejný ex Succow 1974 (31)
- *Oenanthion aquaticae* Hejný ex Bal.-Tul. et al. 1993 (29)

PHR-05 *Nasturtio-Glycerietalia* Pignatti 1953

Herblands and sedge-beds of well-oxygenated freshwater flowing streams of the temperate and mediterranean regions of Europe and Madeira

COOL TEMPERATE GROUP OF ALLIANCES

PHR-05A *Glycerio-Sparganion* Br.-Bl. et Sissingh in Boer 1942

Herbland vegetation of small freshwater streams and in shallow water bodies of temperate Europe

- *Sparganio-Glycerion* Br.-Bl. et Sissingh in Boer 1942 *nom. invers. propos.* (42)
- *Glycerion* Br.-Bl. et Tx. 1943 (2b)
- *Phalarido-Glycerion maximae* Passarge 1964 p.p. (2b)
- *Apion nodiflori* Segal in Westhoff et Den Held 1969 (syntax.syn.)
- *Glycerion fluitantis* Géhu et Géhu-Franck 1987 (29)
- *Nasturtion officinalis* Géhu et Géhu-Franck 1987 (syntax.syn.)
- *Rorippion nasturtium-aquatici* Géhu et Géhu-Franck 1987 *nom. mut. propos.* (45)

phr08 Rivas-Martínez et al. (2002a: 275) formally suggested this name change. (LM)

- *Nasturtio-Veronicion beccabungae* Borhidi 2001 (syntax. syn.)

PHR-05B *Phalaridion arundinaceae* Kopecký 1961

Reed vegetation of freshwater flowing and seasonally fluctuating streams of temperate Europe

phr09 Floristically this alliance is not clearly differentiated, and therefore it should be included into the *Magnocaricion*. (KD)

- *Rumici-Phalaridion* Kopecký (1961) 1968 (29)

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WARM-TEMPERATE GROUP OF ALLIANCES

PHR-05C *Caricion broterianae* (Rivas-Mart. et al. 1986) J.A. Molina 1996

Ibero-Atlantic sedge beds of fast-flowing freshwater streams

- *Caricion reuterianae* (Rivas-Mart. et al. 1986) J.A. Molina 1996 *nom. mut. propos.* (45)

phr10 The formal proposal serving this name change has been published by Rivas-Martínez et al. (2002a: 253); see also Costa et al. (2012: 10). (LM)

PHR-05D *Deschampsion argenteae* Capelo et al. 2000

Madeirean herblands of waterfalls and on walls with slow dripping or flowing laminar water

PHR-06 *Oenanthetalia aquaticae* Hejný ex Balátová-Tuláčková et al. 1993

Vegetation of emergent helophytes in shallow waters with fluctuating water table of temperate and boreal Eurasia

- *Oenanthetalia aquaticae* Hejný in Kopecký et Hejný 1965 (2b)

PHR-06A *Eleocharito palustris-Sagittarion sagittifoliae* Passarge 1964

Vegetation of emergent helophytes on muddy soils of shallows streams and ponds with fluctuating water table of temperate and boreal Eurasia

- *Oenanthion aquaticae* Hejný 1948 (1)
- *Phalarido-Glycerion maximae* Passarge 1964 p.p. (2b)
- *Oenanthion aquaticae sensu auct., non* Hejný ex Neuhäusl 1959 (pseudonym)
- *Cirsio brachycephali-Bolboschoenion* Passarge ex Mucina in Bal.-Tul. et al. 1993 (syntax.syn.)
- *Mentho arvensis-Eleocharition palustris* de Foucault in de Foucault et Catteau 2012 (syntax.syn.)

PHR-06B *Alopecuro-Glycerion spicatae* S. Brullo et al. 1994

Vegetation of hygrophilous herblands of shallow montane pools characterized by large water-depth fluctuations at high altitudes of Sicily

phr11 The *Alopecuro-Glycerion spicatae* was described from the ponds and lakes of the Nebrodi Mts, Sicily. Brullo et al. (1994) justified the delimitation of this alliance by a peculiar species composition being primarily a mixture of species of the *Phragmito-Magnocaricetea* and *Potamogetonetea*, with some other accompanying species straddling the *Phragmito-Magnocaricetea* and *Molinio-Arrhenatheretea*. This composition was ascribed to specific climatic conditions of Sicily characterized by high, yet uneven annual precipitation patterns. There are typical periods of summer drought accompanied by short heavy rains that becomes reflected in high water-level fluctuations in the ponds during the summer. Based on the large cover of the *Potamogetonetea* species in the *Alopecuro-Glycerion* communities, Brullo et al. (1994) classified the *Alopecuro-Glycerion spicatae* within the *Potamogetonetea*. However, most of sampled stands published in the original paper are dominated by *Phragmito-Magnocaricetea* species that determine the physiognomy of the stands. Therefore, we argue that the *Alopecuro-Glycerion* should be assigned to the *Phragmito-Magnocaricetea*. The communities of the *Alopecuro-Glycerion*, and many other types of reed vegetation alike, experience stages of drought and stages of floods with well-developed floating and/or submerged layer of aquatic plants. It appears that this alliance was coined on the basis of communities sampled during the periods of elevated water levels. The *Alopecuro-Glycerion* shares considerable floristic and ecological similarities with the *Eleocharito palustris-Sagittarion sagittifoliae* and partly also with the *Glycerio-Sparganion* characteristic of habitats with fluctuating water level and co-occurrence of numerous aquatic plants during the flooding phase. We consider, however, the status of the *Alopecuro-Glycerion* as insufficiently clear and therefore we prefer maintaining this unit as a separate alliance. As such, we classified this alliance, together with *Eleocharito-Sagittarion*, in the *Oenanthetalia*. This solution should be considered as preliminary as new relevé data should be collected in phases other than in time of flooding to shed light on the yearly dynamics of the floristic composition of this vegetation. (KS, LM)

PHR-07 *Arctophiletalia fulvae* Petryakov et Gogoleva in Kholod 2007

Arctophila wetland grasslands on oligotrophic gyttja soils in the Arctic zone of northeastern Europe, Siberia and North America

phr12 This order name was unintentionally validated by Kholod (2007: 41), who assigned here the only, in his paper validated alliance – the *Arctophilion fulvae*; see Remark *phr13*. (LM)

- *Arctophiletalia fulvae* Lambert 1968 (1)
- *Arctophiletalia fulvae* Pestryakov et Gogoleva 1989 (1)
- *Arctophiletalia fulvae* Pestryakov et Gogoleva in Pestryakov et Okhlopkov 2013 (2b, 5)
- *Arctophiletalia fulvae* Lambert in Daniëls et Thannheiser 2013 (2b, 5)

PHR-07A *Arctophilion fulvae* Pestryakov et Gogoleva in Kholod 2007

Arctophila wetland grasslands on oligotrophic gyttja soils in the Arctic zone of northeastern Europe, Siberia and North America

phr13 This alliance name was unintentionally validated by Kholod (2007: 41), who assigned in this alliance only one validly published association, *Arctophiletum fulvae* Thannheiser 1976 (The paper by Thannheiser 1976 is duly cited in the references, however, the correct full name of the associations should read: *Arctophiletum fulvae* Lambert in Thannheiser 1976). This association becomes automatically the *holotypus* of the *Arctophilion fulvae*. *Arctophila fulva* is on the same page

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in Kholod (l.c.) listed as the character-species of the *Arctophilion fulvae*. 'Pestryakov & Gogoleva 1989' refers to an unpublished manuscript deposited in the VINITI Institute in Moscow. (LM)

- *Arctophilion fulvae* Lambert 1968 (1)
- *Arctophilion fulvae* Pestryakov et Gogoleva 1989 (1)
- *Arctophilion fulvae* Gogoleva in Kononov et al. 1989 (1)
- *Arctophilion fulvae* Lambert in Daniëls et Thannheiser 2013 (2b, 5)
- *Arctophilion fulvae* Pestryakov et Gogoleva in Pestryakov et Okhlopkov 2013 (2b, 5)

VEGETATION OF BOGS AND FENS

SCH *Scheuchzerio palustris-Caricetea fuscae* Tx. 1937

Sedge-moss vegetation of fens, transitional mires and bog hollows in the temperate, boreal and Arctic zones of the Northern Hemisphere

sch01 There are two contrasting (as well as some transitional) approaches to the classification of fens in Europe: (1) The first one is delimiting associations and alliances using dominance of fen plant species with rather wide niches (e.g. Dierßen 1982); (2) the other approach relies on species groups and follows ecological classification into extremely rich fens, rich fens, moderately-rich fens, poor fens, and dystrophic bog hollows (for details see Hájek et al. 2006). The most substantial difference with crucial consequences for nomenclature is that the former approach merges bog hollows with different types of minerotrophic fens dominated by either *Rhynchospora alba* or *Carex limosa* into a single alliance – the *Rhynchosporion albae* Koch 1926. Many vegetation survey accounts keep only the bog hollows in this alliance, that is however, not consistent with the nomenclatural type of the *Rhynchosporion albae*. The other surveys prefer to discern the floristically contrasting minerotrophic fens and ombrotrophic bogs. The second substantial difference is that the former approach involves all mires dominated by *Carex lasiocarpa, C. diandra* and/or *C. chordorrhiza* into a single alliance – the *Caricion lasiocarpae* regardless of variations in total species composition (including bryophytes) controlled by variable base saturation underpinning the principal floristic gradient within the mires. The latter approach divides the principal base-saturation gradient into particular sections that correspond to alliances, with the above-mentioned species occurring in more alliances. These two approaches are so different that the application of nomenclatural rules becomes inherently context-dependent. (MH)

- *Sphagniherbosa* Rübel 1933 p.p. (3d)
- *Caricetales uliginosae* Br.-Bl. et Vlieger in Vlieger 1937 p.p. (orig.form)
- *Scheuchzerio palustris-Caricetea nigrae* Tx. 1937 *nom. mut. propos.* (45)

sch02 Steiner (1993b; see also Theurillat 1997) and Rivas-Martínez et al. (2002a: 278) and Hájek & Hájková (in Chytrý 2011: 614) published the formal proposals serving this name change. (LM)

- *Sphagno-Caricetea fuscae* Duvigneaud 1949 (29c)
- *Caricetea fuscae* Oberd. ex Kuhn 1954 (syntax.syn.)
- *Drepanocladetea* Du Rietz 1954 (29b)
- *Sphagno-Drepanocladetea* Du Rietz 1954 (29b)
- *Drepanocladetea* Traas 1963 (2b)
- *Trichophoretea* Traas 1963 (2b)
- *Caricetea limosae* Malmer 1968 (syntax.syn.)
- *Scorpidietea* Malmer 1968 (29b)
- *Tofieldietea* Malmer 1968 (syntax.syn.)
- *Parvocaricetea* Westhoff in Den Held et Westhoff in Westhoff et Den Held 1969 (orig.form) (syntax.syn.)

sch03 Dengler et al. (2004: 354) put forward a detailed proposal towards conservation of this name against the *Caricetea fuscae* Oberd. ex Kuhn 1954. This name would apply if the vegetation of the bog hollows was excluded from the *Scheuchzerio-Caricetea fuscae* as advocated by Dengler et al. (2004) and some other authors. (LM, MH)

- *Scheuchzerietea* Den Held et al. in Westhoff et Den Held 1969 (syntax.syn.)
- *Drepanocladetea* Tx. 1970 (29b)
- *Trichophoretea* Tx. 1970 (syntax.syn.)
- *Carici-Drepanocladetea* Pałczyński 1975 (3b)
- *Caricetea fuscae* (Den Held et al. in Westhoff et Den Held 1969) de Foucault 1984 (29a)
- *Caricetea nigrae* (Den Held et al. in Westhoff et Den Held 1969) de Foucault 1984 *nom. mut. propos.* (*mut.superfl.*)
- *Minero-Sphagnioni* Tołpa 1985 (3d)

SCH-01 *Caricetalia davallianae* Br.-Bl. 1950 *nom. conserv. propos.*

Sedge-moss vegetation of calcareous and extremely mineral rich brown-moss fens of Eurasia

sch04 The name '*Caricetalia Davallianae ord. nova*' (*recte*: *Caricetalia davallianae*) was validly published in Braun-Blanquet (1949b). The original diagnosis of the name contains the two alliances '*Caricion bicoloris-atrofuscae* Nordhagen 1936' and '*Caricion davallianae* Klika 1934' with no bibliographical reference to Nordhagen ('1936', *recte*: 1937) and Klika (1934). However, the two associations '*Caricetum Davallianae* (Br.-Bl.) W. Koch 1926 em.' and '*Schoenetum nigricantis* W. Koch 1926' were indicated to belong to the '*Caricion davallianae*' and there is a bibliographical reference to Koch (1926), where the *Schoenetum nigricantis* was validly described and where the *Caricetum davallianae* was mentioned with the reference to Dutoit (1924). Therefore, technically, Braun-Blanquet published the '*Caricion davallianae* Klika ex Braun-Blanquet' that is a

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later homonym of Klika's name. The date of the name is 1950 because the bibliographical references were published only in Braun-Blanquet (1950) (ICPN art. 6). Therefore, the '*Caricion davallianae* Klika ex Braun-Blanquet 1950' being validly published, the '*Caricetalia davallianae* Braun-Blanquet 1950' is also validly published as a consequence. However, with the name *Caricetalia davallianae* Braun-Blanquet 1950, being a later syntaxonomic synonym of the *Tofieldietalia* Soó 1949, it is proposed to conserve it against the earlier name as it has been much more widely used than the less known *Tofieldietalia*. (JPT)

- *Tofieldietalia* Soó 1949 *nom. ambig. rejic. propos.* (36)

sch05 The name '*Tofieldietalia*' was validly published in Soó (1949). The original diagnosis of the order contains the unique alliance '*Eriophorion latifolii*' with two associations, such as the '*Schoenetum nigricantis transsilvanicum*' and the '*Cariceto flavae-Eriophoretum*'. Soó (l.c.) further commented that 'in the systematic review of the associations of Kolozsvár (AGH. VI, 10) I placed them in the *Molinietalia'* providing in this way a bibliographical reference to an original diagnosis for the associations ('AGH. VI, 10' stands for *Acta Geobotanica Hungarica* 6(1): 10). In von Soó (1947), both the '*Cariceto flavae-Eriophoretum* Soó 1944' and the '*Schoenetum nigricantis transsilvanicum* Soó 1946' contain sufficient diagnoses including lists of species with the indication of constancies. The name '*Eriophorion latifoliae* Br.-Bl. et Tx.' is validly published in 1947 with only the '*Cariceto flavae-Eriophoretum* Soó 1944' as an element of its original diagnosis. Therefore, the name *Tofieldietalia* Soó 1949 is validly published with the *Eriophorion latifolii* Br.-Bl. et Tx. ex von Soó 1947 to which '*Schoenetum nigricantis transsilvanicum* Soó 1946' has been added in 1949 and the diagnosis of which in von Soó (1947) contains the eponymous species *Tofieldia calyculata*. (JPT)

- *Tofieldietalia* Preising in Oberd. 1949 (2b)
- *Eu-Caricetalia davallianae* (Br.-Bl. 1949) Pignatti 1953 (34b)
- *Tofieldietalia* Kuhn 1954
- *Drepanoclado-Caricetalia* Succow 1974 (syntax.syn.)
- *Eleocharitetalia quinqueflorae* Passarge 1978 (syntax.syn.)
- *Junco triglumis-Equisetetalia variegati* Julve 1983 (1)
- *Molinio-Caricetalia davallianae* Julve 1983 (1)
- *Molinio-Caricetalia davallianae* Terrisse 2000 (2b, 5)
- *Menyantho trifoliatae-Caricetalia lasiocarpae* Julve 1993 (syntax.syn.)

sch06 The only validly described alliance classified into the *Menyantho trifoliatae-Caricetalia lasiocarpae* by Julve (1993) is the' *Caricion lasiocarpae* Vanden Berghen in Lebrun et al. 1949' whose correct type is the *Caricetum lasiocarpae* Koch 1926 that represents vegetation of the *Caricetalia davallianae*. (MH)

SCH-01A *Caricion davallianae* Klika 1934

Sedge-moss calcareous mineral-rich fen vegetation of Europe and Western Asia

- *Parvocaricion* Rübel 1933 p.p. (2b)
- *Schoenion ferruginei* Nordhagen 1936 (phantom)
- *Schoenion ferruginei* Nordhagen 1937 (29a)

sch07 Nordhagen (1937) explicitly admitted to having renamed the Klika's *Caricion davallianae*, because *Schoenus ferrugineus* should better characterize the alliance at a broader geographical scale. (MH)

- *Caricion davallianae* Guinochet 1938 (31)
- *Eriophorion latifolii* Br.-Bl. et Tx. 1943 (2b)
- *Eriophorion latifolii* Br.-Bl. et Tx. ex Soó 1947 (syntax. syn.)
- *Caricion lasiocarpae* Vanden Berghen in Lebrun et al. 1949 (syntax.syn.)

sch08 The *Caricetum lasiocarpae* Koch 1926 must be considered as the nomenclature type of this alliance since it is the only validly described association assigned to this alliance by Vanden Berghen (in Lebrun et al. 1949). Koch's association represents the wetter face of the *Caricion davallianae* as it contains calciphilous species such as *Carex davalliana, C. hostiana, C. lepidocarpa, Dactylorhiza incarnata, Eriophorum latifolium, Epipactis palustris, Pinguicula vulgaris, Schoenus ferrugineus, Spiranthes aestivalis* and no *Sphagnum* species. Because the *Caricion lasiocarpae* has been frequently used only for the acidophilous mire vegetation, it could be considered as a typical case of a *nomen ambiguum*. However, if not rejected as *nomen ambiguum*, it must be considered as a synonym of the *Caricion davallianae* or used only for the calciphilous vegetation with *Carex diandra, C. lasiocarpa, Menyanthes trifoliata* and the *Caricetalia davallianae* species. If the *Caricion lasiocarpae* were understood broadly (hence with moderately-rich and poor fens included), than the name *Stygio-Caricion limosae* would have priority over the *Caricion lasiocarpae*. (MH)

- *Epipacto-Schoenion ferruginei* Duvigneaud 1949 (orig. form) (29a)
- *Scorpidion* Du Rietz 1949 (29b)
- *Schoenion continentale* Pignatti 1953 (34a)
- *Caricion paradoxae* Vicherek 1958 (syntax.syn.)
- *Scorpidion* Traas 1963 (2b)
- *Eleocharition pauciflorae* Passarge 1964 (syntax.syn.)
- *Eleocharition quinqueflorae* Passarge 1968 (phantom)
- *Halo-Trichophorion pumili* Vicherek 1973 (syntax.syn.)
- *Eleocharition quinqueflorae* Passarge 1978 (syntax.syn.)
- *Blysmion compressi* Quézel ex Lovrič et Rac 1989 (syntax.syn.)
- *Schoenion nigricantis* Giugni 1991 (syntax.syn.)
- *Baeothryion alpini* Julve 1993 (2b, 5)
- *Caricion chordorrhizo-lasiocarpae* (Vanden Berghen in Lebrun et al. 1949) Julve 1993 (29a)

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- *Junco subnodulosi-Caricion lasiocarpae* Julve 1993 (2b, 5)
- *Hydrocotylo vulgaris-Schoenion nigricantis* de Foucault Royer et al. 2006 (2b)
- *Hydrocotylo vulgaris-Schoenion nigricantis* de Foucault 2008 (syntax.syn.)

SCH-01B *Caricion viridulo-trinervis* Julve ex Hájek et Mucina in Theurillat et al. 2015

Low-sedge vegetation of subsaline dune slack fens of Western European Atlantic seaboards

- *Caricion pulchello-trinervis* de Foucault 1984 (phantom)
- *Caricion pulchello-trinervis* de Foucault 1984 ex Julve 1989 (phantom)
- *Caricion viridulae ssp. viridulae var. pulchello-trinervis* (de Foucault 1984) Julve 1989 (orig.form) (phantom)
- *Caricion scandinavicae-trinervis* Julve 1989 (1)
- *Caricion viridulae ssp. viridulae var. pulchello-trinervis* Julve 1993 (orig.form) (5)

SCH-01C *Caricion atrofusco-saxatilis* Nordhagen 1943

Low-sedge low-productivity calcareous fens on mineral soils and gravelly substrates not accumulating peat of the Alps, the Pyrenees, Scandinavia and the European Arctic archipelagos

- *Caricion atrofuscae* Nordhagen 1935 (2b)
- *Caricion bicoloris* Nordhagen 1935 (2b)
- *Caricion bicolori-atrofuscae* Nordhagen 1936 (phantom)
- *Caricion bicolori-atrofuscae* Nordhagen 1937 (2b)
- *Salicion myrsinitis* Kalliola 1939 (2b)
- *Caricion incurvae* Br.-Bl. in Volk 1940 (3f)

sch09 The name '*Caricion incurvae*' is invalidly published in Volk (1940) because the relevés of the unique validly published association of the original diagnosis of the alliance – the '*Typhetum minimae*' ('*Typha minima-Equisetum variegatum*-Assoziation') – do not contain *Carex incurva* (ICPN art. 3f). (JPT)

- *Caricion maritimae* Br.-Bl. in Volk 1940 *nom. mut. propos.* (2b, 3f, *mut.superfl.*)

SCH-02 *Sphagno warnstorfii-Tomentypnetalia* Lapshina 2010

Sedge and brown-moss nitrogen-limited fen vegetation of Western Siberia and the northeastern European lowlands

- *Tomentypno-Sphagnetalia warnstorfii* Dahl 1956 ex Rybníček 1974 (orig.form) (phantom)
- *Ranunculo-Drepanocladetalia* Philippi 1973 (2b)
- *Caricetalia diandrae* Pałczyński 1975 (3b)
- *Tomentypno-Sphagnetalia warnstorfii* Smagin 2007 (2b, 5)

SCH-02A *Saxifrago-Tomentypnion* Lapshina 2010

Sedge and brown-moss moderately calcareous topogenic nitrogen-limited fen vegetation of the boreal and subarctic zones of Western Siberian and the northeast European lowlands

sch10 This is a recently described alliance that needs to be clearly delimited from the *Caricion davallianae*, *Magnocaricion elatae* and *Stygio-Caricion limosae*. (MH)

- *Caricion diandrae* Pałczyński 1975 (3b)

SCH-02B *Caricion stantis* Matveyeva 1994

Brown-moss rich fens of the subartic and Arctic zones of Svalbard, Greenland, Novaya Zemlya, Taymyr and the Canadian Arctic

- *Dupontion fischeri sensu auct., non* Hadač 1946 (pseudonym)
- *Caricion aquatilis* Lambert 1968 (1)
- *Caricion aquatilis* Lambert et Krajina in Lambert 1968 (1)
- *Ranunculo hyperborei-Drepanocladion revolventis* Philippi 1973 (2b, 3b)
- *Caricion stantis* Kojima 1991 (3b)
- *Caricion stantis* Elvebakk 2002 (phantom)

SCH-02C *Stygio-Caricion limosae* Nordhagen 1943

Extremely waterlogged brown-moss minerotrophic neutral fens in the boreal zone of Northern Europe and on deep old peats of the Central European mountains

sch11 This alliance includes waterlogged, minerotrophic, non-calcareous brown-moss fens containing boreal semi-aquatic mosses (*Calliergon trifarium, Scorpidium scorpioides*) and sedges such as *Carex chordorrhiza, C. limosa* and *Carex lasiocarpa*. According to Nordhagen (1943), it comprises neither vegetation of hollows of ombrotrophic bogs nor of peat moss-dominated mires and therefore it cannot be synonymized either with the *Scheuchzerion palustris* Nordhagen ex Tx. 1937 nor with the *Rhynchosporion albae* Koch 1926 that is dominated by peat mosses and contains grassland and other nutrient-demanding species, and does not contain either *Carex limosa* or *C. chordorrhiza*. Unlike the *Caricion davallianae*, the *Stygio-Caricion limosae* does not contain calcicolous vascular elements of the *Caricion davallianae*. On the other hand, if one accepts a broad concept of the *Caricion lasiocarpae* Vanden Berghen in Lebrun et al. 1949, and simultaneously accepts that the *Rhynchosporion albae* should not include the ombrotrophic bog hollows, the name *Stygio-Caricion limosae* must be used instead of the *Caricion lasiocarpae* because of priority reasons. The *Stygio-Caricion limosae* is still used in recent Scandinavian studies (e.g. Moen et al. 2012). (MH)

- *Rhynchosporion albae sensu auct., non* Koch 1926 (pseudonym)
- *Meeseo-Caricion limosae* (Preising in Oberd. 1957) Passarge 1978 (29a)

SCH-02D *Sphagno warnstorfii-Tomentypnion nitentis* Dahl 1957

Moderately calcium-rich sedge-moss fens of the boreal zone and montainous regions in the nemoral zone of Europe

sch12 KD and Dengler et al. (2004) suggested considering this syntaxon synonymous with the *Caricion fuscae* Koch 1926. In contrast to the *Caricion fuscae* Koch 1926 (syn: *Caricion canescenti-nigrae* Nordhagen 1937), the communities of this alliance contain calcicolous species characteristic of the *Caricetalia davallianae*, a group of boreal mosses characterizing rich fens as well as species of moderately

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rich and poor fens. The *Sphagno warnstorfii-Tomentypnion nitentis* is an ecologically well-defined alliance and still in use in regional and national vegetation surveys across Europe (e.g. in former Czechoslovakia: Hájek & Hájková in Chytrý 2011; Dítě et al. 2007; in Scandinavia: Moen et al. 2012, and in Russia: Korotkov et al. 1991; Koroleva 2006; Lapshina 2010). If not accepted, the communities of this alliance should be classified in the *Caricion fuscae* and the *Caricion davallianae* (e.g. Dierßen 1982). (MH)

- *Mesotrichophorion* Traas 1963 p.p. (2b)
- *Caricion lasiocarpae sensu auct.* p.p., *non* Vanden Berghen in Lebrun et al. 1949 (pseudonym)
- *Caricion demissae* Rybníček 1964 (3b)
- *Caricion pulicaris* Passarge 1964 (phantom)
- *Caricion tumidicarpae* Rybníček 1964 (phantom)
- *Caricion demissae* Rybníček 1974 (syntax.syn.)

sch13 Rybníček (1974) typified this alliance by the *Chrysohypno-Trichophoretum alpini* Březina et al. 1964, the original of which diagnosis contains relevés with calcium-tolerant peat mosses and calcicolous species typical of the *Sphagno-Tomentypnion* as accepted there. (MH)

- *Sphagnion teretis* Succow 1974 p.p. (29b)
- *Campylio-Tomentypnion* de Molenaar 1976 (syntax.syn.)
- *Betulo nanae-Tomentypnion nitentis* Smagin 1999 (5)
- *Bistorto-Caricion diandrae* Smagin 2007 (2b, 5)

sch14 This alliance was invalidly published since Smagin (2007) designated the '*Bistorto-Caricetum diandrae* Korchagin 1940' as the *holotypus.* However, there is no validly published *Bistorto-Caricetum diandrae* in Korchagin (1940). Instead there is '*Warnstorfio-Sphagnetum diandro-caricosum*' in the latter publication that was chosen by Smagin (2007) as the nomenclatural type of the '*Bistorto-Caricetum diandrae* Korchagin 1940' (sic!). This typification is clearly invalid since a coenotaxon (not relevé or plot!) of the Russian School (hence a unit outside of the regulation of the ICPN!) was chosen as the '*typus*' of an association. Because of the invalid status of the '*typus*', the alliance remains not typified, hence invalid. (LM)

- *Oxycocco palustris-Sphagnion warnstorfii* Lapshina 2010 (syntax.syn.)

SCH-03 *Caricetalia fuscae* Koch 1926

Sedge-moss vegetation of slightly to strongly acidic minerotrophic moderately-rich or poor fens in the boreal and temperate zones of the Northern Hemisphere and in the supramediterranean belt of Southern European mountains

- *Caricetalia fuscae* Koch 1928 (phantom)
- *Caricetalia nigrae* Koch 1926 *nom. mut. propos.* (45)

sch15 Steiner (1993b: 142; see also Theurillat 1997), Rivas-Martínez et al. (2002a: 252) and Hájek & Hájková (in Chytrý 2011: 618) formally suggested this name change. This case was handled by the Nomenclature Commission, and no conclusion has been met as yet (Willner et al. 2011). (LM)

- *Drepanocladetalia exannulati* Krajina 1933 (syntax.syn.)
- *Drepanocladetalia exannulati* Krajina 1934 (phantom)

sch16 The second part of the Krajina's paper was published in 1933 and not in 1934 as usually erroneously cited. (JPT)

- *Scheuchzerio-Caricetalia nigrae* Nordhagen 1936 (phantom)
- *Caricetalia goodenowii* Nordhagen 1937 *nom. mut. propos.* (45)
- *Caricetalia nigrae* Nordhagen 1937 *nom. mut. propos.* (45)
- *Molinio-Caricetalia fuscae* Duvigneaud 1949 (29)

sch17 Duvigneaud (1949) refers to Nordhagen ('1936', *recte:* 1937), hence introducing a new (superfluous) name for the *Caricetalia goodenowii*. (LM)

- *Herbotrichophoretalia* Traas 1963 (2b)
- *Junco-Caricetalia nigrae* Doing 1963 (2b)
- *Anagallido tenellae-Juncetalia bulbosi* Br.-Bl. 1967 (syntax.syn.)
- *Scheuchzerio-Caricetalia fuscae* (Koch 1926) Görs et T. Müller in Oberd. et al. 1967 (2b)
- *Narthecietalia* Lakušić 1968 (phantom)
- *Narthecietalia* Lakušić 1973 (syntax.syn.)
- *Sphagno-Caricetalia* Succow 1974 (syntax.syn.)
- *Junco acutiflori-Caricetalia nigrae* Julve 1983 (1)
- *Caricetalia intricatae* de Foucault 1984 (1)
- *Caricetalia magellanicae* de Foucault ex Julve 1993 (2b, 3b)

ARCTIC AND BOREO-NEMORAL GROUP OF ALLIANCES

SCH-03A *Drepanocladion exannulati* Krajina 1933

Arcto-alpine intermediate non-calcareous fens of boreo-arctic Europe and the high mountains of Central and Southern Europe

- *Drepanocladion exannulati* Krajina 1934 (phantom)
- *Eriophorion scheuchzeri* Hadač 1937 (2b)
- *Eriophorion scheuchzeri* Hadač 1939 *nom. dubium* (38)

sch18 The original diagnosis of this unit described from SW Iceland contains a synthetic table formed in an unclear way and containing a mixture of species characterizing different vegetation types such as the *Caricion atrofusco-saxatilis*, the *Caricion fuscae*, the *Scheuchzerio-Caricetea fuscae* as well as species characteristic of the *Phragmito-Magnocaricetea* and the *Potamogetonetea*. It is impossible to re-check individual relevés for their homogeneity. Hadač (1969) typified this alliance by the *Eriophoretum scheuchzeri islandicum* that contains species of mineral-rich arcto-alpine fens typical of the *Caricion atrofusco-saxatilis* (*Carex maritima, Juncus triglumis, Sedum villosum* and *Triglochin palustre*), while the species typical of the *Caricion fuscae* are rare. Some authors used the name '*Eriophorion scheuchzeri* Hadač 1937' for species-poor, strongly acidophilous arcto-alpine vegetation. (MH)

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SCH-03B *Caricion fuscae* Koch 1926 *nom. conserv. propos.*

Sedge-moss vegetation moderately to low calcium-rich slightly acidic fens dominated by calcifuge brown-mosses or nutrient-demanding peat-mosses of Europe

sch19 Hájek & Hájková in Chytrý (2011: 619, 662) argued for rejecting the name *Caricion fuscae* Koch 1926 as *nomen ambiguum*, because the relevés presented in the original diagnosis feature the *Caricion davallianae* communities, and the name *Caricion fuscae* was never used for this type of vegetation. In all subsequent studies, the *Caricion fuscae* was used either for moderately rich or poor fens or both. The *Caricion fuscae* was typified in Rivas-Martínez et al. (2011) by choosing the *Caricetum nigrae* J. Braun 1915 as the *typus.* This typification is superfluous because the alliance is automatically typified by the *Caricetum fuscae* (ICPN art. 20). Koch (1926) did not publish a diagnosis of this association, but referred to older descriptions of the *Caricetum fuscae* in the text. However, none of these descriptions represents the *Caricion fuscae* in the current sense. Therefore we propose to conserve the name *Caricion fuscae* Koch 1926 with a conserved type – in order to use this well established name for moderate to lowly calcium-rich slightly acidic fens dominated by calcifuge brown-mosses or nutrient-demanding peat-mosses of Europe. (MH, LM, JPT, WW)

- *Caricion nigrae* Koch 1926 *nom. mut. propos.* (45)

sch20 Steiner (1993b: 142; see also Theurillat 1997), Rivas-Martínez et al. (2002a: 253) and Dengler et al. (2004: 358) formally suggested this name change. This case was handled by the Nomenclature Commission, yet no conclusion has been met (Willner et al. 2011). In case the *Caricion fuscae* Koch 1926 becomes recognized as *nomen ambiguum*, this name mutation becomes obsolete. (LM)

- *Rhynchosporion albae* Koch 1926 (syntax.syn.)

sch21 The *Rhynchosporion albae* Koch 1926 was described as vegetation of minerotrophic fens with diagnostic species such as *Rhynchospora alba, Agrostis canina* and three *Sphagnum* of the sect. *Subsecunda,* of which *S. subsecundum* dominates. These species indicate moderately mineral-rich but acidic fens traditionally assigned to the *Caricion fuscae* and they are not bog-hollow species at any account. Of all species listed in the original diagnosis, only *Rhynchospora alba* can thrive in ombrotrophic bog hollows. There was a group of nutrient-demanding grassland species, some other *Caricetalia fuscae* species (e.g. *Carex echinata*), reed-bed and even some calcicolous elements (*Carex davalliana*) listed as the accompanying species. However, the name *Rhynchosporion albae* has frequently been misinterpreted as vegetation of dystrophic bog pools (e.g. Steiner 1992; Pott 1995; Gerdol & Tomaselli 1997; Philippi in Oberdorfer 1998: 221–272; Matuszkiewicz 2001). The need to distinguish between the ombrotrophic bog hollows and moderately calcium-rich minerotrophic fens is emphasized by some authors (e.g. Dengler et al. 2004; Lapshina 2010). The name could therefore represent a case of *nomen ambiguum*. If not rejected, it should be either considered as a syntaxonomic synonym of the *Caricion fuscae* following its nomenclature type) or used only for the permanently waterlogged, moderately rich fens of the *Caricetalia fuscae*. The vegetation of the ombrotrophic bog hollows should then be classified within the *Scheuchzerion palustris*. (MH) KD disagrees with this account and suggests using the name *Rhynchosporion albae* Koch 1926 for the vegetation of dystrophic bog pools.

- *Parvocaricion* Rübel 1933 p.p. (2b)
- *Caricion canescenti-goodenowii* Nordhagen 1936 (phantom)
- *Caricion canescenti-goodenowii* Nordhagen 1937 (syntax. syn.)

sch22 Besides presenting a list of sociations belonging to this order, Nordhagen (1937) further stated: "Das *Caricetum fuscae* von Dutoit (1924: 28) und dasjenige Braun-Blanquets aus Auvergne (1926a): 43) reihen sich aber wieder unserem *Caricion canescentis-goodenowii* zwanglos an." Both Dutoit's (1924) and Braun-Blanquet's (1926a) associations were validly described and represent moderately rich fens. The alliance is therefore validly described. (MH) The formal proposal for the mutation of the name has been presented by Dengler et al. (2004: 358) and by Hájek & Hájková (in Chytrý 2011: 660). (LM)

- *Caricion canescenti-nigrae* Nordhagen 1937 (30)
- *Caricion canescentis* Kalliola 1939 (2b)
- *Parvocaricion canescentis-fuscae* Duvigneaud et Vanden Berghen 1945 (syntax.syn.)
- *Caricion lasiocarpae sensu auct.* p.p., *non* Vanden Berghen in Lebrun et al. 1949 (pseudonym)
- *Eriophorion gracilis* Oberd. 1956 (2b)
- *Eriophorion gracilis* Preising ex Oberd. 1957 (syntax.syn.)

sch23 This alliance is typified by the *Rhynchosporo-Caricetum chordorrhizae* (Paul et Lutz 1941) Oberd. 1957 (see Koska in Dengler et al. 2004). The type material of this association is rather heterogeneous with respect to pH and physiognomy of moss layer, but most relevés suggest that this unit is close to the *Caricion fuscae*. (MH)

- *Acrocladion* Traas 1963 (2b)
- *Mesotrichophorion* Traas 1963 p.p. (2b)
- *Rhynchosporo-Sphagnion* (Koch 1926) Jasnowski 1968 (29)
- *Caricion curto-nigrae* (Koch 1926) Westhoff et Den Held 1969 (31)
- *Droserion intermediae* Succow 1974 (syntax.syn.)
- *Sphagnion teretis* Succow 1974 p.p. (29b)
- *Calamagrostion neglectae* Pałczynski 1975 (31)
- *Ranunculo-Caricion fuscae* Passarge 1978 (syntax.syn.)
- *Junco acutiflori-Caricion lasiocaropae* Julve 1993 (2b, 5)
- *Carici-Nardion* V. Ranđelović 1998 (2b)

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- *Caricion canescenti-nigrae* Nordhagen ex Tx. 1937 *corr.* Timmermann in Dengler et al. 2004 (30)
- *Carici-Nardion* V. Ranđelović ex V. Ranđelović et Zlatković 2010 (2b, 3b, 5)

SCH-03C *Anagallido tenellae-Juncion bulbosi* Br.-Bl. 1967

Ibero-Atlantic moderately-rich fens

sch24 A discussion of the nomenclature of this unit can be found in Fernández Prieto & Herrera Gallastegui (1991). This alliance remains widely accepted by French (Bardat et al. 2004) and Iberian (Rivas-Martínez et al. 2011; Costa et al. 2012; Fernández Prieto et al. 2012) authors. (LM) KD doubts the scientific validity of this syntaxonomic concept because of very large sampling scales used in collecting the relevé material on which basis the *Anagallido-Juncion* was described. (LM)

- *Anagallido tenellae-Juncion acutiflori* Br.-Bl. 1967 *nom. corr. propos.* (*corr.superfl.*)

SCH-03D *Sphagno-Caricion canescentis* Passarge (1964) 1978 *nom. conserv. propos.*

Peat-moss acidic poor yet minerotrophic fens of the boreal and temperate zones of the Northern Hemisphere

sch25 Alternatively, this unit would fit very well within the ecological unit called 'poor fens' (Hájek et al. 2006). In many recent vegetation surveys however, poor and moderately rich fens are merged into a single alliance *Caricion fuscae* Koch 1926. In some other surveys, poor fens strongly dominated by calcifuge *Sphagnum* species are classified either in the *Sphagno-Caricion canescentis* Passarge (1964) 1978 (Valachovič 2001; Chytrý 2011) or in the *Caricion canescenti-fuscae* Nordhagen 1937 (Dengler et al. 2004: sub: '*Caricion canescentis-nigrae* Nordhagen ex Tx. 1937 *corr*. Timmermann in Dengler et al. 2004'). However, the name '*Caricion canescentis–fuscae* (Koch 1928) Nordhagen 1937' published by Tüxen (1937) is an illegitimate correction (ICPN art. 30) of the *Caricion canescenti-goodenowii* Nordhagen 1937 because Tüxen (1937) referred to Nordhagen (1937) using an unambiguous bibliographical reference. Nordhagen's name was published validly as it included the validly described associations *Caricetum fuscae* Dutoit 1924 and *Caricetum fuscae* Braun-Blanquet 1915, both undoubtedly representing moderately rich fens and not *Sphagnum*-dominated poor fens. The name *Caricion canescenti-goodenowii* hence cannot be used for poor fens delimited from moderately rich fens. The alliance comprising only poor fens and not moderately rich fens hence should carry a different name. We propose to conserve the name *Sphagno-Caricion canescentis* Passarge (1964) 1978 against the *Sphagnion recurvi* Succow 1974 that had not been in use in any recent national vegetation survey. In addition, the name '*Sphagnion recurvi* Succow 1974' should to be corrected since *Sphagnum recurvum s.str.* does not occur in Eurasia (except for the Azores). (MH) KD suggests that this syntaxon should be considered synonymous with the *Caricion fuscae* Koch 1926.

- *Apiculation* Du Rietz 1949 (orig.form) (2b)
- *Caricion lasiocarpae sensu auct.* p.p., *non* Vanden Berghen in Lebrun et al. 1949 (pseudonym)
- *Oligomesotrichophorion* Traas 1963 (2b)
- *Sphagnion palustris* Segal 1966 (2b)
- *Sphagnion amblyphylli* Segal 1968 (2b)
- *Sphagnion recurvi* Succow 1974 *nom. rejic. propos*.
- *Agrostio caninae-Caricion curtae* Julve 1993 (2b, 5)
- *Carici lasiocarpae-Eriophorion vaginati* Vorobiov et al. 1997 (syntax.syn.)
- *Comaro palustris-Juncion effusi* Passarge 1999 (syntax. syn.)
- *Chamaedaphno-Sphagnion obtusi* Lapshina 2010 (syntax. syn.)

sch26 The nomenclatural type of this alliance is the *Carici lasiocarpae-Sphagnetum recurvi* (Lapshina 2010), hence in our system it should be considered as syntaxonomic synonym of the *Sphagno-Caricion canescentis*.

RELICT OROMEDITERRANEAN GROUP OF ALLIANCES

SCH-03E *Festucion frigidae* Rivas-Mart. et al. 2002

Relict oromediterranean moderately-rich fens of the Sierra Nevada (Southern Iberian Peninsula)

SCH-03F *Caricion intricatae* Quézel 1953

Relict oromediterranean moderately-rich fens of Corsica

- *Bellidio-Bellion nivalis* Gamisans 1975 (syntax.syn.)
- *Bellidio-Bellion nivalis* Gamisans 1977 (31)

SCH-03G *Narthecion scardici* Horvat ex Lakušić 1968

Relict oromediterranean moderately-rich fens of the Balkans

ch27 Resolving the syntaxonomic position of this unit requires a large-scale comparative study. (MH)

- *Carici-Narthecion scardici* Horvat 1936 (2b)
- *Narthecion scardici* Horvat 1936 (2b)
- *Narthecion scardici* Horvat 1960 (3a, 3b)
- *Narthecion scardici* Horvat 1960 *emend*. Lakušić 1969 (orig.form) (*sensu* Lakušić 1968) (phantom)
- *Narthecion scardici* Horvat ex Lakušić 1970 (31)
- *Orchidion bosniacae* Lakušić 1973 (2b)

SCH-04 *Scheuchzerietalia palustris* Nordhagen ex Tx. 1937

Ombrotrophic bog-hollow vegetation of Eurasia

- *Rhynchosporetalia* Rübel 1933 (2b)
- *Sphagnetalia* Rübel 1933 (2b)
- *Scheuchzerietalia palustris* Nordhagen 1936 (phantom)
- *Scheuchzerietalia palustris* Nordhagen 1937 (2b)
- *Apiculetetalia* Du Rietz 1954 (orig.form) (2b)
- *Sphagnetalia cuspidati* Du Rietz 1954 (2b)
- *Sphagno-Caricetalia* Pałczyński 1975 (3b)
- *Drosero longifoliae-Rhynchosporetalia albae* Tx. in Fujiwara 1979 (2b)

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- *Drosero longifoliae-Rhynchosporetalia albae* Tx. 1980 (phantom)

SCH-04A *Scheuchzerion palustris* Nordhagen ex Tx. 1937

Ombrotrophic bog-hollow vegetation of Eurasia

sch28 This vegetation was formerly classified within the *Rhynchosporion* together with moderately rich minerotrophic fens. I suggest that recognizing a separate alliance for ombrotrophic bog hollows is ecologically sensible because all ecological classifications of mires use ombrotrophic and minerotrophic conditions as the leading classification criteria. Dengler et al. (2004) proposed to separate bog hollows from the *Scheuchzerio-Caricetea fuscae*. Because the *Rhynchosporion albae* was described from minerotrophic fens, the latter name cannot be used for the vegetation classified here as the *Scheuchzerion palustris.* (MH) KD disagrees with this solution.

- *Rhynchosporion albae sensu auct., non* Koch 1926 (pseudonym)
- *Rhynchosporion* Rübel 1933 (2b)
- *Sphagnion cuspidati* Krajina 1933 *nom. dubium* (38)

sch29 Krajina (1933) used extremely large plots (100–800 m^2) and besides bog hollows his relevés covered also the surrounding wetland and scrub. Krajina himself synonymized, with question mark, this alliance with the *Sphagnion fusci* (i.e., the *Oxycocco-Sphagnetea* hummocks). Although the name characterizes bog hollows well, the type relevés are too heterogeneous and therefore the name should be considered as *nomen dubium*. (MH)

- *Sphagnion cuspidati* Krajina 1934 (phantom)
- *Scheuchzerion palustris* Nordhagen 1936 (phantom)
- *Scheuchzerion palustris* Nordhagen 1937 (2b)
- *Caricion rotundatae* Kalliola 1939 (2b)

sch30 Kalliola (1939) referred to the *Scheuchzerion palustris* as a synonym of the *Caricion rotundatae* Kalliola, hence the latter name becomes *nomen superfluum* even though the relevés presented in his paper correspond rather to the *Caricion fuscae* or to the *Stygio-Caricion limosae*. (MH, LM)

- *Leuko-Scheuchzerion palustris* Nordhagen 1943 (2b)
- *Scheuchzerio-Rhynchosporion albae* Duvigneaud 1949 (syntax.syn.)
- *Scheuchzerio-Rhynchosporion albae* (Koch 1926) Succow 1974 (29a)
- *Molinio caeruleae-Rhynchosporion albae* (Koch 1926) de Foucault 1984 (29a)
- *Sphagnion baltici* Kustova 1987 (1)
- *Sphagnion baltici* Kustova in Lapshina 2010 (syntax.syn.)

OXY *Oxycocco-Sphagnetea* Br.-Bl. et Tx. ex Westhoff et al. 1946

Dwarf-shrub, sedge and peat-moss vegetation of the Holarctic ombrotrophic bogs and wet heath on extremely acidic soils

- *Sphagniherbosa* Rübel 1933 p.p. (3d)
- *Caricetales uliginosae* Br.-Bl. et Vlieger in Vlieger 1937 p.p. (orig.form) (34a)
- *Oxycocco-Sphagnetea* Br.-Bl. et Tx. 1943 (2b)
- *Vaginato-Sphagnetea* Duvigneaud 1949 (phantom)
- *Ombrosphagnetea* Du Rietz 1954 (orig.form) (29b)
- *Vaccinietea uliginosi* Lohmeyer et Tx. in Tx. 1955 (2b)
- *Vaginato-Sphagnetea* Malmer 1968 (orig.form)
- *Andromedo polifoliae-Vaccinietea oxycocci* Julve 1992 (1)
- *Vaccinio oxycocco-Sphagnetea magellanici* Br.-Bl. et Tx. 1943 *corr*. Julve 1993 (2b, *mut.superfl.*)
- *Ombro-Sphganioni* Tołpa 1985 (3d)

OXY-01 *Erico-Ledetalia palustris* Tx. 1937

Dwarf-shrub, sedge and peat-moss vegetation of the raised bogs and wet heath of the atlantic and subatlantic regions of Western and Northern Europe

- *Ledetalia palustris* Nordhagen 1936 (phantom)
- *Ledetalia palustris* Nordhagen 1937 (2b)
- *Erico-Sphagnetalia* Schwickerath 1940 (phantom)
- *Erico-Sphagnetalia* Schwickerath 1941 (syntax.syn.)
- *Sphagno papillosi-Ericetalia tetralicis* Schwickerath 1941 *nom. invers. propos.* (42)

oxy01 A formal proposal to invert the name was published by Dengler et al. (2004: 351). Since this name is considered to be a synonym of the *Erico-Ledetalia*, this proposal is considered obsolete. (LM)

- *Erico-Sphagnetalia* Duvigneaud 1949 (phantom)
- *Sphagno-Ericetalia* Br.-Bl. in Br.-Bl. et al. 1947 (2b)
- *Sphagno-Ericetalia* Br.-Bl. 1949 (phantom)
- *Sphagno-Ericetalia* Br.-Bl. in Br.-Bl. et Tx. 1952 (32d)
- *Trichophoro-Sphagnetalia* Malmer 1968
- *Eriophoro vaginati-Sphagnetalia papillosi* Tx. in Tx. et al. 1972 (syntax.syn.)
- *Sphagnetalia compacti* Tx. et al. 1972 (3b)
- *Sphagnetalia papillosi* Tx. 1978 (2b)
- *Caricetalia pauciflorae* Julve 1992 (1)

OXY-01A *Ericion tetralicis* Schwickerath 1933

Dwarf-shrub, sedge and peat-moss vegetation of moist peaty heath on gleic and podzolic soils of the atlantic and subatlantic regions of Western Europe

- *Ulici-Ericion tetralicis* (Schwickerath 1933) Tx. 1937 (29a)
- *Trichophoro-Ericion tetralicis* (Schwickerath 1933) Duvigneaud 1947 (29a)
- *Scirpion caespitosi* Oberd. 1957
- *Narthecion ossifragi* Vanden Berghen 1958 (syntax.syn.)
- *Droserion longifoliae* Julve 1992 (1)
- *Erico mackaianae-Sphagnion papillosi* (Fernández Prieto et al. 1987) Rivas-Mart. et al.1999 (syntax.syn.)

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OXY-01B *Oxycocco-Ericion tetralicis* Nordhagen ex Tx. 1937

Sedge and peat-moss vegetation of oligotrophic bogs on organic peat of the atlantic and subatlantic regions of Western and Northern Europe

- *Oxycocco-Ericion tetralicis* Nordhagen 1936 (phantom)
- *Oxycocco-Ericion tetralicis* Nordhagen 1937 (2b)
- *Sphagnion europaeum* Schwickerath 1940 (phantom)
- *Sphagnion europaeum* Schwickerath 1941 (34a)
- *Carici-Sphagnion papillosi* Malmer 1964
- *Erico-Sphagnion* Moore 1968 (syntax.syn.)
- *Calluno-Sphagnion papillosi* (Schwickerath 1933) Tx. in Tx. et al. 1972 (2b)
- *Molinio caerulei-Sphagnion papillosi* Smagin 2012 (3b, 5)

OXY-02 *Sphagnetalia medii* Kästner et Flössner 1933

Dwarf-shrub and peat-moss vegetation of the continental, subcontinental, boreo-continental and high-altitude raised bogs of the Northern Hemisphere

- *Sphagnetalia* Pawłowski 1928 (2b)
- *Sphagnetalia* Rübel 1933 (2b)
- *Sphagnetalia magellanici* Kästner et Flössner 1933 *nom. mut. propos.* (45)

oxy02 The proposal was made by Steiner (1993a) and published also by Theurillat (1997). The proposed mutation of the name (see Dengler in Berg et al. 2004: 587) has been handled by the Nomenclature Commission, yet without reaching a decision (Willner et al. 2011). (LM)

- *Oxycocco-Ledetalia* Nordhagen 1943 (3b)
- *Sphagnetalia fusci* Tx. 1955 (2b)
- *Trichophoro-Sphagnetalia* Malmer 1968 p.p. (syntax.syn.)
- *Eriophoretalia vaginati* Julve 1992 (1)
- *Sphagno fallacis-Eriophoretalia vaginati* Timmermann in Dengler et al. 2004 (syntax.syn.)

OXY-02A *Oxycocco microcarpi-Empetrion hermaphroditi* Nordhagen ex Du Rietz 1954 *nom. conserv. propos.*

Dwarf-shrub and peat-moss raised bog vegetation in the boreal and Arctic zones of Europe

oxy03 I propose to conserve this name against the *Sphagnion fusci* Br.-Bl. 1949. The latter alliance is automatically typified by the *Sphagnetum fusci* Luquet 1926 (ICPN art. 20) that represents undoubtedly the same vegetation as the *Oxycocco-Empetrion hermaphroditi* Nordhagen ex Du Rietz 1954. However Braun-Blanquet (1949c) explicitly stated that he considered the *Sphagnion fusci* to be vicarious to the '*Oxycocco-Empetrion hermaphroditi* Nordhagen 1936' and listed character species of the alliance that are rather indicative of the *Sphagnion magellanici* Kästner et Flössner 1933. Consequently, the interpretation of the concept of this alliance became ambiguous and some authors considered it to be a synonym of the *Sphagnion magellanici* (e.g., Steiner 1992) despite the fact that its type would exclude such an interpretation. On the contrary, the name *Oxycocco-Empetrion hermaphroditi* Nordhagen ex Du Rietz 1954 has usually been applied unequivocally in many recent vegetation surveys in Europe. (MH)

- *Sphagnion fusci* Br.-Bl. 1920 (phantom)
- *Sphagnion fusci* Br.-Bl. 1926 (2b)

oxy04 A proposal to reject this name was made by Steiner (1993a: 169; see also Theurillat 1997), it appears to be superfluous however, since the proposal name was invalidly published anyway. (LM)

- *Oxycocco-Empetrion hermaphroditi* Nordhagen 1936 (phantom)
- *Oxycocco-Empetrion hermaphroditi* Nordhagen 1937 (2b, 3b)
- *Oxycocco-Ledion palustris* Nordhagen 1936 (phantom)
- *Oxycocco-Ledion palustris* Nordhagen 1937 (2b)
- *Oxycocceto-Rubion chamaemori* Kalliola 1939 (orig.form) (2b)
- *Vaccinio microcarpi-Rubion chamaemori* Kalliola 1939 (phantom)
- *Oxycocco-Empetrion hermaphroditi* Nordhagen 1943 (3b)
- *Sphagnion fusci* Br.-Bl. 1949 (2b)
- *Eu-Fuscion* Du Rietz 1950 (orig.form) (34b)
- *Oxycocco-Empetrion hermaphroditi* Nordhagen ex Hadač et Váňa 1967 (31)
- *Calluno-Sphagnion fusci* Tx. in Tx. et al. 1972 (syntax. syn.)
- *Ledo decumbentis-Sphagnion fusci* Tx. et al. 1972 (3b)
- *Vaccinion microcarpi* Julve 1992 (1)

OXY-02B *Sphagnion medii* Kästner et Flössner 1933

Dwarf-shrub and peat-moss vegetation of the subcontinental, temperate and mountain raised bogs of Eurasia

- *Eriophorion vaginati* Krajina 1933 (syntax.syn.)
- *Sphagnion medii* Rübel 1933 (2b)
- *Sphagnion magellanici* Kästner et Flössner 1933 *nom. mut. propos.* (45)

oxy06 The proposed mutation of the name (see Steiner 1993a; Theurillat 1997; Dengler in Berg et al. 2004: 587) has been handled by the Nomenclature Commission, yet without reaching a decision (Willner et al. 2011). The most recent proposal to mutate the name was published by Hájková et al. (in Chytrý 2011: 708). (LM)

- *Eriophorion vaginati* Krajina 1934 (phantom)
- *Sphagnion europaeum* Schwickerath 1941 (34a)
- *Vaginato-Sphagnion europaeum* Duvigneaud 1949 (orig.form) (14, 29c)
- *Andromedo-Sphagnion europaeum* Doing 1963 (2b)
- *Sphagnion medio-fusci* Malmer 1968 (phantom)
- *Sphagno fallacis-Eriophorion vaginati* Timmermann in Dengler et al. 2004 (syntax.syn.)

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ANTHROPOGENIC VEGETATION

PAR *Papaveretea rhoeadis* S. Brullo et al. 2001 *nom. conserv. propos.*

Annual weed segetal vegetation of arable crops, gardens and vineyards in the cool-temperate and boreal zones of Eurasia

par01 The syntaxonomic concept of the class corresponds roughly to the older, well-established concept of the *'Secalietea'*. (JPT)

- *Ruderali-Secalietea* Br.-Bl. et al. 1936 p.p. (3f)

par02 Braun-Blanquet et al. (1936) coined a broadly conceived class of the *'Ruderali-Secalinetales'* encompassing almost all of then known anthropogenic (ruderal and segetal) vegetation. This very broadly conceived class was abandoned as soon as Tüxen (1950) had recognized the ecological and floristic differences between the ruderal and segetal vegetation. (LM)

- *Stellarietea mediae* Tx. et al. in Tx. 1950 (2b)
- *Stellarietea mediae* Tx. et al. in Tx. ex von Rochow 1951 *nom. ambig. rejic. propos.* (36)
- *Secalinetea* Br.-Bl. in Br.-Bl. et al. 1952 (orig.form) (3f)
- *Thero-Chenopodietea* J. Tx. in Müller 1963 (2b)
- *Thero-Chenopodietea* Lohmeyer et al. in J. Tx. 1966 (2b)
- *Polygono-Chenopodietea* Eliáš 1986 (2b)

PAR-01 *Aperetalia spicae-venti* J.Tx. et Tx. in Malato-Beliz et al. 1960 *nom. conserv. propos.*

Weed vegetation of cereal fields and gardens on acidic and nutrient-poor soils in the cool-temperate and boreal zones of Eurasia

par03 Some authors prefer to separate the weed communities of cereal fields on poor sandy-loamy soils from those of summer crops. The *Aperetalia spicae-venti* would then include the *Scleranthion annui* and *Rumicion bucephalophori*. (EB)

- *Arvetalia* Rübel 1933 p.p. (2b)
- *Atriplici-Chenopodietalia albi* (Tx. 1937) Nordhagen 1940 *nom. ambig. rejic. propos.* (36)

par04 In Nordhagen (1940), the order '*Chenopodietalia medioeuropaea* Tüxen 1937' (containing three alliances: *Arction lappae, Atropion* and '*Chenopodion polyspermi*') was renamed *Atriplici-Urticetalia*, and two new alliances (*Atriplicion litoralis* Nordhagen 1940 and *Agropyro-Rumicion* Nordhagen 1940) were added. Presently, these five alliances belong to three different classes. The *Cakiletea maritimae* today accommodates the latter two alliances, the *Epilobietea angustifolii* contains the *Arction* and *Atropion,* and the *Polygono-Chenopodion polyspermi*, designated by Kropáč (2006) as the type of the order belongs currently to the *Papaveretea rhoeadis*. However, the name *Polygono-Chenopodion polyspermi* is considered a *nomen ambiguum* (see also Theurillat et al. 1995), as this name has often been used for the syntaxonomic concept of the *Veronico-Euphorbion* (see Kropáč 2006: 147). (JPT)

- *Austro-Chenopodietalia* Rothmaler 1943 (2b)
- *Chenopodietalia albi* (Tx. 1937) Tx. et Lohmeyer in Tx. 1950 (2b)
- *Centaureetalia* Tx et al. ex von Rochow 1951 *nom. ambig. rejic. propos.* (36)

par05 The name '*Centaureetalia cyani* (Tx. 1937) Tx., Lohm., Prsg. 1950)' is validly published in von Rochow (1951: 6) with a unique alliance for communities on acidic soils, the '*Agrostidion spicae-venti* (Kruseman et Vlieger 1939) Tx. apud Oberdorfer 1949' (recte: *Agrostion spicae-venti* Tx. ex von Rochow 1951). Therefore, the name *Centaureetalia cyani* cannot be used for an order of the base-rich communities. The correct name for the latter is the *Papaveretalia rhoeadis* Hüppe et Hofmeister in Theurillat et al. 1995. Both Theurillat et al. (1995) and Dengler et al. (2003) proposed independently to consider the name '*Centaureetalia cyani*' as *nomen ambiguum* (ICPN art. 36). (JPT)

- *Polygono-Chenopodietalia* Tx. et Lohmeyer ex J. Tx. in Lohmeyer et al. 1962 (2b)
- *Polygono-Chenopodietalia* Tx. et Lohmeyer in Tx. ex Oberd. 1962 (2b)
- *Solano nigri-Polygonetalia convolvuli* (Sissingh in Westhoff et al. 1946) O. de Bolòs 1962 (syntax.syn.)
- *Lolio-Linetalia* J. Tx. in T. Müller 1963 (2b)
- *Polygono-Chenopodietalia* J Tx. in T. Müller 1963 (2b)
- *Polygono-Chenopodietalia* J. Tx. in Passarge 1964 (syntax. syn.)
- *Lolio-Linetalia* J. Tx. 1966 (2b)
- *Veronico-Arabidopsietalia thalianae* Passarge 1977 (syntax.syn.)
- *Sperguletalia arvensis* Hüppe et Hofmeister 1990 (5)
- *Centaureetalia cyani* Tx., Lohmeyer et Preising ex Mucina 1993 (31)

par06 Mucina (1993c: 113) published a nomenclatural remark about the invalidly published new order '*Papaveretalia*' in Hüppe & Hofmeister (1990) saying that, since the *Caucalidion lappulae* (the type of the '*Centaureetalia*') is included in the *Papaveretalia,* than the older name *Centaureetalia* should be retained. By so doing, Mucina (l.c.) incidentally validated the invalidly published name '*Centaureetalia cyani* R. Tx., Lohmeyer et Preising in R. Tx. 1950', with the validly published name '*Caucalidion lappulae* (R. Tx. 1950) von Rochow 1951' being one of the two alliances included in the *Centaureetalia,* with an unambiguous bibliographical reference to von Rochow (1951). The validated name *Centaureetalia* had however already been validly published by von Rochow (1951) and therefore the Mucina's (l.c.) later validation created a later homonym (ICPN art. 31). In addition, the heterotypic homonym '*Centaureetalia cyani* Tx., Lohmeyer et Preising ex Mucina 1993' is to be considered a *nomen ambiguum* (ICPN art. 36) because its syntaxonomic content does not cover the type

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of the '*Centaureetalia cyani* Tx., Lohmeyer et Preising ex von Rochow 1951'. (JPT)

- *Dicranello staphylinae-Stellarietalia mediae* Manthey in Dengler et al. 2003 (syntax.syn.)

PAR-01A *Scleranthion annui* (Kruseman et Vlieger 1939) Sissingh in Westhoff et al. 1946

Weed segetal vegetation of winter cereal crops on neutral to acidic loamy and sandy-loamy soils of the (sub)atlantic regions in the nemoral zone of Europe

- *Agrostion spicae-venti* Tx. 1947 (2b)
- *Aperion spicae-venti* Tx. ex Oberd. 1949 (syntax.syn.)
- *Agrostion spicae-venti* Tx. ex von Rochow 1951 (syntax. syn.)
- *Aperion spicae-venti* Tx. ex Oberd. 1957 (31)
- *Aphanion arvensis* J.Tx. et Tx. in Malato-Beliz et al. 1960 (syntax.syn.)
- *Arnoseridion minimae* Malato-Beliz et al. 1960 (syntax. syn.)
- *Arabidopsion thalianae* Passarge 1964 (syntax.syn.)

PAR-01B *Oxalidion europaeae* Passarge 1978

Weed segetal vegetation of gardens and root crop fields on acidic loamy and sandy-loamy soils of the subatlantic to subcontinental regions in the nemoral zone of Europe

- *Olitorion* Rübel 1933 (orig.form) (2b)
- *Spergulo-Oxalidion* Görs in Oberd. et al. 1967 (2b)
- *Galeopsion speciosae-pubescentis* Kojić 1972 (syntax.syn.)
- *Oxalidion fontanae* Passarge 1978 *nom. mut. propos.* (45)

par07 The proposal to mutate this name was made by Lososová (in Chytrý 2009: 122). (LM)

PAR-01C *Galeopsion bifidae* Abramova in Mirkin et al. 1985

Weed segetal vegetation of gardens and root crop cultures on acidic sandy-loamy soils in the continental hemiboreal and boreal zones of Eastern Europe and Siberia

- *Papaverion rhoeadis* V. Solomakha 1987 (syntax.syn.)
- *Stachyion palustris* Kireeva 1988

PAR-02 *Papaveretalia rhoeadis* Hüppe et Hofmeister ex Theurillat et al. 1995 *nom. conserv. propos.*

Weed segetal vegetation of arable crops on base-rich soils in the forest, forest-steppe, steppe and subboreal zones of Europe

- *Secalietalia* Libbert 1932 (3f)
- *Arvetalia* Rübel 1933 p.p. (2b)
- *Secalino-Violetalia* Br.-Bl. et Tx. 1943 (orig.form) (3f)
- *Secalino-Violetalia* Br.-Bl. et Tx. ex Sissingh in Westhoff et al. 1946 (orig.form) (3f)
- *Anagallidetalia* Knapp 1948 (2b)
- *Centaureetalia cyani* Tx. et al. in Tx. 1950 (2b)
- *Centaureetalia cyani* Tx., Lohmeyer et Preising in Tx. ex von Rochow 1951 *nom. ambig. rejic. propos.* (36)
- *Papaveretalia rhoeadis* Hüppe et Hofmeister 1990 (5)
- *Stachyetalia annuae* Ries 1992 (5)
- *Papaveretalia rhoeadis* Hüppe et Hofmeister ex Manthey in Dengler et al. 2003 (31)

ALLIANCES OF THE NEMORAL ZONE

PAR-02A *Caucalidion* Tx. ex von Rohow 1951

Weed segetal vegetation of cereal crops on the base-rich soils of Western, Central and southeastern Europe

- *Secalinion* Br.-Bl. 1931 (2b, 3f)
- *Secalinion* Libbert 1933 (2b, 3f)
- *Secalinion medioeuropaeum* Tx. 1937 (3f)
- *Triticion sativae* Klika in Klika et Novák 1941 (2b, 3f)
- *Eu-Secalinion* (Br.-Bl. in Br.-Bl. et al. 1936) Sissingh in Westhoff et al. 1946 (3f)
- *Triticion* Oberd. 1949 (2b)
- *Caucalidion lappulae eurosibiricum* Tx. 1950 (2b)
- *Caucalidion platycarpi* von Rochow 1951 *nom. mut. propos.* (*mut.illeg.*)

par08 Rivas-Martínez et al. (2002a: 254) formally suggested this name change. (LM)

- *Secalinion orientalis* Slavnić 1951 (3f, 34a)
- *Caucalidion* Tx. ex Oberd. 1957 (2b)
- *Eu-Secalinion* Sissingh et Tideman 1960 (orig.form) (34b)
- *Centaurion cyani* Lakušić 1962 (2b)
- *Linarion spuriae* Sissingh in Doing 1963 (2b)
- *Sherardion arvensis* Kropáč et Hejný in Kropáč 1978 (syntax.syn.)
- *Camelinion microcarpae* Ries 1991 (2b)
- *Centaurion cyani* Redžić 2007 (3b, 31)

PAR-02B *Linion* Rothmaler 1944

Weed segetal vegetation of flax fields of temperate Europe

par09 This weed vegetation, exclusively accompanying cultivation of flax (*Linum usitatissimum*) in the temperate Europe (Rothmaler 1944; J. Tüxen 1966) has most probably been eradicated by the improvement of the seed purification procedures. See Kornaś (1961) and Lososová in Chytrý (2009: 80) on the account of the special ecology and history of this enigmatic witness of long-gone agricultural practices. (LM)

- *Lolio remoti-Linion* Tx. 1955 (2b)
- *Lolio remoti-Linion* J. Tx. 1966

PAR-02C *Veronico-Euphorbion* Sissingh in Passarge 1964

Weed segetal vegetation of vineyards and gardens on the base-rich soils of Central and Western Europe

- *Veronico-Euphorbion* Sissingh 1942 (1)
- *Veronico-Chenopodion* J. Tx. in T. Müller 1963 (2b)
- *Fumario-Euphorbion* T. Müller ex Görs 1966 (syntax. syn.)
- *Veronico-Chenopodion* J. Tx. 1966 (syntax.syn.)
- *Veronico- Euphorbion* Knapp 1971
- *Muscario-Allion* Passarge 1978 (2b)
- *Thlaspio-Anchusion arvensis* Waldis 1987 (syntax.syn.)

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ALLIANCES OF THE FOREST-STEPPE AND STEPPE ZONES

PAR-02D *Matricario chamomillae-Chenopodion albi* Timár 1954

Summer-annual segetal weed vegetation on clayey subsaline soils of the subcontinental regions of Central and Eastern Europe

PAR-02E *Anthemido ruthenicae-Sisymbrion orientalis* V. Solomakha 1990

Winter-annual segetal weed vegetation of cereal crops on base-rich soils of Crimea

PAR-02F *Lamio amplexicaule-Calepinion irregularis* Bagrikova 1996

Weed segetal vegetation of vineyards on the base-rich soils of Crimea

- *Mercuriali annuae-Cirsion incani* Bagrikova 1996 (syntax.syn.)

PAR-02G *Chenopodio albi-Descurainion sophiae* V. Solomakha et al. in V. Solomakha 1988

Weed segetal vegetation of cereal crops on chernozem soils in the forest-steppe zone of Ukraine

PAR-02H *Erysimo repandi-Lycopsion orientalis* V. Solomakha 1996

Weed segetal vegetation of arable crops on kastanozem and chernozem soils in the steppe zone of Ukraine

PAR-02I *Lactucion tataricae* Rudakov in Mirkin et al. 1985

Weed segetal vegetation on chernozem soils in the steppe zone of Southern Russia

PAR-03 *Gladiolo italici-Ridolfietalia segeti* Mucina *ined.*

Mediterranean winter-annual weed segetal vegetation of arable crops

par10 A format description of this unit will be presented elsewhere. (LM)

- *Secalietalia* Br.-Bl. 1931 (2b, 3f)
- *Secalietalia mediterraneanea* Br.-Bl. ex Br.-Bl. et al. 1936 (3f)
- *Secalietalia mediterranea* Oberd. 1954 (34a)
- *Chrysanthemetalia segeti* Nègre 1959 (2b)

PAR-03A *Ridolfion segeti* Nègre ex Rivas-Mart. et al. 1999

Weed segetal vegetation of arable crops on neutral loamy-clayey soils in the thermo- and mesomediterranean belts of North Africa and the Southern Mediterranean

- *Ridolfion segeti* Nègre 1977 (2b)
- *Ridolfion segeti* Nègre ex El Antri 1983 (5)

PAR-03B *Roemerion hybridae* Rivas-Mart., Fernández-González et Loidi in Loidi et al. 1997

Weed segetal vegetation of arable crops on basic substrates in the meso- and supramediterranean belts of the Mediterranean

- *Secalion* Br.-Bl. 1931 (2b, 3f)
- *Secalion* Br.-Bl. in Br.-Bl. et al. 1936 (3f)
- *Secalion mediterraneum* Tx. 1937 (3f)
- *Austro-Secalinion* Rothmaler 1943 (2b)
- *Secalinion orientale* Oberd. 1954 (3f)
- *Veronico chaubardii-Scandicion graecae* Ferro et Scammacca 1985 (syntax.syn.)
- *Vicio narbonensis-Milion vernalis* Ferro et Scammacca 1985 (syntax.syn.)

par11 This name was supposed to replace the name '*Secalinion orientalis* Oberd. 1954' that is both illegitimate (ICPN art. 34a) and invalid (ICPN art. 3f). Ferro & Scammacca (1985) gave this syntaxonomic concept a new valid name (V*icio narbonensis-Milion vernalis* Ferro et Scammacca 1985). This step cannot be considered as merely *nomen novum* for the *Secalinion orientale* and therefore we do not consider the citation of Oberdorfer (1954) as part of the new name as appropriate or necessary. (LM)

- *Roemerion hybridae* Rivas-Mart. et al. 1999 (31)

PAR-03C *Rumicion bucephalophori* Nezadal 1989

Weed segetal communities of winter cereal crops on nutrient-poor soils in the meso- and supramediterranean belts of the Mediterranean

PAR-03D *Fumarion wirtgenii-agrariae* S. Brullo in S. Brullo et Marcenò 1985

Weed segetal vegetation of vineyards, orchards and hoed crops in the thermomediterranean belt of the Western and Central Mediterranean

- *Diplotaxio erucoidis-Urticion urentis* Carretero et Aguilella 1995 (syntax.syn.)

SIS *Sisymbrietea* Gutte et Hilbig 1975

Zoo-anthropogenic and modern anthropogenic vegetation of animal shelters and disturbed ruderal sites in cool- and cold-temperate regions of Eurasia

- *Onopordo-Sisymbrietea* Görs 1966 p.p. (3b)
- *Sisymbrietea* Korneck 1974 (3f)

SIS-01 *Sisymbrietalia sophiae* J. Tx. ex Görs 1966 *nom. conserv. propos.*

Ruderal vegetation of annual nutrient-demanding herbs and grasses on disturbed soils in the nemoral and steppe zones of Europe

sis01 The conservation of this name (as suggested by Dengler et al. 2003: 599) was motivated by protecting it as well-known and widely used against the older but less known and hardly used valid name for the same syntaxonomic concept – the *Chenopodio-Urticetalia* Libbert 1932. (LM, JD)

- *Chenopodio-Urticetalia* Libbert 1932 *nom. ambig. rejic. propos.* (36)
- *Sisymbrietalia* J. Tx. in Lohmeyer et al. 1962 (2b)
- *Sisymbrietalia officinalis* J.Tx. in Lohmeyer et al. 1962 (2b)
- *Sisymbrietalia* J. Tx. ex Oberd. 1962 (phantom)
- *Sisymbrietalia* J. Tx. in Müller 1963 (2b)
- *Cannabidetalia sativae* Golub et al. 2012 (syntax.syn.)

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SIS-01A *Atriplicion* Passarge 1978 *nom. conserv. propos.*
Ruderal vegetation of tall summer-annual herbs on sandy-loamy nutrient-rich ruderal soils of subcontinental temperate Europe
sis02 Passarge (1978) listed four associations in the '*Atriplicion* Hejný 76'. There is no paper by Hejný published in 1976 mentioned in the list of references in Passarge (l.c.). In fact there is no such paper published by S. Hejný related to this topic at all. Passarge listed four associations in the original diagnosis of the alliance, among which two have a reference to a sufficient diagnosis, the validly published '*Sisymbrio-Atriplicetum oblongifoliae* Oberd. 1957' and the *'Atriplici-Brassicetum nigrae* Pass. (64) 78'. For the latter name, there is a reference to Passarge (1964) who published a '*Brassica nigra-Atriplex*-Ges." (Passarge 1964: 85) serving as the original diagnosis of the *'Atriplici-Brassicetum nigra*e Pass. (64) 78'. On all accounts, the *'Atriplicion* Passarge 1978' is validly published. Although there are several species of *'Atriplex'* in the relevés of the original diagnosis of the alliance, the correct citation of the name is '*Atriplicion nitentis* Passarge 1978' because in the index of the plant communities (p. 190) Passarge added the specific epithet in referring to the alliance. Because this name has been more often used than the older *Brachyaction ciliatae* and the *Sisymbrion sophia*e (see the Remarks below) as well as the equally old *Atriplici–Sisymbrion* Hejný 1978 we suggest conserving the *Atriplicion* Passarge 1978 against the latter listed names in order to stabilize the nomenclature. (LM)
- *Sisymbrion* Oberd. 1956 (2b)
- *Sisymbrion sophiae* Tx. et al. ex Görs 1966 (syntax.syn.)

sis03 In Görs (1966), there is no reference to von Rochow (1951) for the alliance '*Sisymbrion* Tx., Lohm, Prsg. 50' (pp. 478, 530). It is therefore, the name in Görs has to be considered as published independently from the latter name. In the original diagnosis of the name '*Sisymbrion* Tx., Lohm, Prsg. ex Görs 1966' there is no *Sisymbrium officinale*, but only *S. sophia* and therefore the name '*Sisymbrion sophiae* Tx., Lohm, Prsg. ex Görs 1966' is not a later homonym of the '*Sisymbrion officinalis* Tx., Lohm, Prsg. ex von Rochow 1951' when the specific epithet are added according to ICPN Rec. 10C. (JPT)
- *Brachyaction ciliatae* Pop et Viţalariu 1971 (syntax.syn.)

sis04 This alliance was validly described (Pop & Viţalariu 1971), with the *Erigeronto canadensis-Brachyactetum ciliatae* (the *holotypus* of the alliance) described in the same paper. This name as well as the other validly described alliance in Romanian literature for the same syntaxonomic contents – the *Sisymbrion sophiae* Mititelu et Barabaş 1972, have been hardly used in the European phytosociological literature. (LM)
- *Sisymbrion sophiae* Mititelu et Barabaş 1972 (31)

sis05 The (valid) description of this alliance is one of those serendipitous events. The lectotype of this alliance is '*Sisymbrietum sophiae* Kreh 35' (see Mititelu & Barabaş 1972: 133). Yet it is to be considered a later homonym of the *Sisymbrion sophiae* Tx. et al. ex Görs 1966. (LM)
- *Atriplicion tataricae* Gutte 1973 (2b)
- *Atriplicion* Hejný 1976 (phantom)
- *Atriplici–Sisymbrion* Hejný 1978 (syntax.syn.)

sis06 For the reasons of the validity of this name, see Dengler et al. (2003: 599). (LM)
- *Chenopodio-Atriplicion tataricae* (Mucina in Krippelová et Mucina 1988) Mucina 1991 (2b)
- *Rumici crispi-Polygonion avicularis* Bagrikova 1996 (syntax.syn.)

SIS-01B *Cannabion sativae* Golub et al. 2012
Ruderal vegetation of tall summer-annual herbs on heavy clayey nutrient-rich soils of continental Eastern Europe
- *Salsolo-Atriplicion nitentis* Fiodorov in Mirkin et al. 1986 (2b, 5)

SIS-01C *Malvion neglectae* (Gutte 1972) Hejný 1978
Ruderal vegetation of low-grown short-lived summer-annual herbs on nutrient-rich loamy and slightly trampled soils of temperate Europe
- *Malvion neglectae* Hejný in Hejný et al. 1979 (31)

SIS-01D *Sisymbrion officinalis* Tx. et al. ex von Rochow 1951
Ruderal vegetation of nutrient-demanding short-lived winter-annual grasses on sandy anthropogenic soils of temperate Europe
- *Bromo-Hordeion murini* (Allorge 1922) Lohmeyer 1950 (*sensu* Solomakha 1996) (phantom)
- *Sisymbrion officinalis* Tx. et al. in Tx. 1950 (2b)
- *Sisymbrion officinalis* Tx. et al. ex Görs 1966 (phantom)
- *Bromo-Hordeion murini* Hejný 1978 (syntax.syn.)

SIS-02 *Hackelio deflexae-Blitetalia foliosi* Mucina *ordo nov. hoc loco*
Therophyte-rich zoogenic vegetation of mammal lairs under stone overhangs in the mountains of Europe, Middle East, Central Asia and southern Africa
sis07 This vegetation offers a window into the vegetation of naturally disturbed sites such as mammal lairs (incl. those of pre-historic man). As a rule, it only occurs in small patches, under rock overhangs. They exemplify a precious relict of the pre-historic zoo-anthropogenic communities. Syntaxonomically it deserves recognition at least at the level of order that, at present, contains only one validly described alliance – the *Erysimo wittmannii-Hackelion* (Bernátová 1986: 55); this alliance is designated here as the *holotypus (hoc loco)* of the new order. Further syntaxa shall undoubtedly be described from other continents (Asia, Africa). The diagnostic species of the order are the same as stipulated for the alliance in its protologue: *Anisantha tectorum, Arabis nova, Asperugo procumbens, Blitum foliosum, Corydalis capnoides, Cynoglossum officinale, Descurainia sophia, Erysimum wittmannii, Hackelia deflexa* and *Poa*

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nemoralis. A detailed syntaxonomic synthesis of these communities is under preparation. (LM)

- *Asperuginetalia* Rübel 1933 (orig.form) (2b)

SIS-02A *Erysimo wittmannii-Hackelion* Bernátová 1986

Therophyte-rich zoogenic vegetation of mammal lairs under stone overhangs in the mountains of Central Europe

- *Asperuginion* Rübel 1933 (orig.form) (2b)

CHE *Chenopodietea* Br.-Bl. in Br.-Bl. et al. 1952

Winter-annual weed segetal and ruderal vegetation of man-made habitats of the Mediterranean, the mild-winter Atlantic seaboards and Macaronesia

che01 Dengler et al. (2003: 598) suggested considering this name as a *nomen ambiguum* (for the reasoning see the latter publication). (LM)

- *Secalietea* Br.-Bl. 1931 (phantom)
- *Ruderali-Secalietea* Br.-Bl. et al. 1936 p.p. (3f)
- *Calenduletea algeriensis* Nègre 1959 (2b)
- *Cardaminetea hirsutae* Géhu 1999 (phantom)
- *Cardaminetea hirsutae* Géhu 2000 (syntax.syn.)
- *Anthrisco caucalidis-Geranietea purpurei* Rivas-Mart. et al. 2001 (2b)
- *Geranio purpurei-Cardaminetea hirsutae* Rivas-Mart. et al. (1999) Rivas-Mart. et al. 2002 (syntax.syn.)

CHE-01 *Brometalia rubenti-tectorum* (Rivas Goday et Rivas-Mart. 1973) Rivas-Mart. et Izco 1977 *nom. conserv. propos.*

Winter-annual ruderal vegetation of summer-dry man-made habitats of the Mediterranean, the mild-winter Atlantic seaboards and Macaronesia

- *Thero-Brometalia annua* Rivas Goday et Rivas-Mart. 1963 (3b)
- *Thero-Brometalia annua* Rivas Goday et Rivas-Mart. ex Esteve 1973 (3f)
- *Thero-Brometalia* Rivas Goday et Rivas-Mart. ex O. de Bolòs 1975 *nom. ambig. rejic. propos.* (36)

che02 The name *Thero-Brometalia* Rivas Goday et Rivas-Mart. ex de Bolòs 1975 would have the priority over the name *Thero-Brometalia* Rivas Goday et Rivas-Mart. in Rivas-Mart. 1975, however, the unique alliance of the order in de Bolòs (1975) is the *Bromo-Oryzopsion* O. de Bolòs 1970, the type of which (unique association) is the *Inulo-Oryzopsietum miliaceae* A. Bolòs y Vayreda et O. de Bolòs ex O. de Bolòs 1957. This means that, according to its type, the *Thero-Brometalia* Rivas Goday et Rivas-Mart. ex O. de Bolòs 1975 is a syntaxonomic synonym of the *Elytrigio repentis-Dittrichietalia viscosae*. (JPT)

MEDITERRANEAN ANNUAL HERBLANDS

CHE-01A *Alysso granatensis-Brassicion barrelieri* Rivas-Mart. et Izco 1977

Spring pioneer vegetation in man-made habitats on nutrient-poor soils of the Spanish Meseta Central

- *Thero-Bromion* Rivas Goday et Rivas-Mart. 1963 (3b)

CHE-01B *Resedo lanceolatae-Moricandion* Fernández Casas et M.E. Sánchez 1972

Annual nitrophilous and subnitrophilous vegetation of (semi) arid regions of the Southern Iberian Peninsula and Canary Islands

- *Carrichtero annuae-Amberboion lippii* Rivas Goday et Rivas-Mart. 1963 (3b)
- *Carrichtero annuae-Amberboion lippii* Rivas Goday et Rivas-Mart. ex Esteve 1973 (syntax.syn.)

CHE-01C *Cerintho majoris-Fedion cornucopiae* Rivas-Mart. et Izco ex Peinado et al. 1986

Weed segetal vegetation on lime-rich clays in man-made habitats in the thermomediterranean belt of the Southern Iberian Peninsula

- *Cerintho-Mandragorion* Rivas Goday et Rivas-Mart. 1963 (2b, 3b)
- *Cerintho-Fedion cornucopiae* Rivas-Mart. et Izco 1977 (2b)

CHE-01D *Echio-Galactition tomentosae* O. de Bolòs et Molinier 1969

Mediterranean tall-herb ruderal vegetation on calcareous nutrient-rich disturbed man-made soils

CHE-01E *Fedio-Convolvulion cupaniani* S. Brullo et Spampinato 1986

Weed segetal vegetation of vineyards, abandoned fields and roadsides in the thermo- and mesomediterranean belts of Sicily

- *Cerintho majoris-Convolvulion cupaniani* (S. Brullo et Spampinato 1986) de Foucault 2012

MEDITERRANEAN AND MACARONESIAN ANNUAL GRASSLANDS

CHE-01F *Hordeion murini* Br.-Bl. in Br.-Bl. et al. 1936

Mediterranean ruderal winter-annual grasslands

- *Hordeion murini* Br.-Bl. 1931 (2b)
- *Hordeion leporini* Br.-Bl. in Br.-Bl. et al. 1936 *corr.* O. de Bolòs 1962 *nom. mut. propos.* (45)
- *Rudereto-Hordeion* Rothmaler 1943 (orig.form) (2b, 3a)
- *Hordeion* Br.-Bl. in Br.-Bl. et al. 1947 (2b)

che03 The correction of the name of this syntaxon is not warranted since *Hordeum leporinum* is often considered a subspecies of *H. murinum*. (LM)

CHE-01G *Bromo-Hirschfeldion incanae* Lohmeyer 1975

Macaronesian ruderal winter-annual grasslands

CHE-01H *Laguro ovati-Bromion rigidi* Géhu et Géhu-Franck 1985

Ephemeral therophytic vegetation on disturbed coastal sand dunes of the Atlantic coast of France

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CHE-01I *Linario polygalifoliae-Vulpion alopecuri* Br.-Bl., Rozeira et Silva in Br.-Bl. et al. 1972

Ephemeral therophytic vegetation on disturbed coastal dunes of the submediterranean Cantabro-Atlantic Iberian seaboards

- *Scrophulario frutescentis-Vulpion alopecuri* Br.-Bl., Rozeira et Silva in Br.-Bl. et al. 1972 (phantom)

che04 Rivas-Martínez et al. (2011: 194) claims it is *nomen dubium* without giving any grounds. In Braun-Blanquet et al. (1972) there is no name '*Scrophulario frutescentis-Vulpion alopecuroris*'. (LM)

- *Vulpion alopecuroidis* Rivas-Mart. et Izco 1977 (2b)
- *Linario viscosae-Vulpion alopecuri* Rivas-Mart. et Izco ex Rivas-Mart. et al. 1980 (syntax.syn.)

CHE-01J *Taeniathero-Aegilopion geniculatae* Rivas-Mart. et Izco 1977

Therophytic grasslands in abandoned overgrazed habitats of the Spanish Meseta Central

- *Aegilopsidion* Rivas Goday et Rivas-Mart. 1963 (orig. form) (3b)

CHE-01K *Laguro ovati-Vulpion fasciculatae* Géhu et Biondi 1994

Ephemeral therophytic vegetation on disturbed coastal dunes of the Ligurian-Tyrrhenian seaboards

- *Catapodio hemipoae-Vulpion fasciculatae* de Foucault 1999 (phantom)
- *Catapodio hemipoae-Vulpion fasciculatae* de Foucault 2001 (syntax.syn.)

CHE-01L *Securigero securidacae-Dasypyrion villosi* Cano-Ortiz, Biondi et Cano in Cano-Ortiz et al. ex Di Pietro in Di Pietro et al. 2015

Therophytic anthropogenic grasslands in fallow-land habitats of the central regions of the Apennine Peninsula

- *Securigero securidacae–Dasypyrion villosi* Cano-Ortiz, Biondi in Cano-Ortiz et al. 2014 (5)
- *Securigero securidacae–Dasypyrion villosi* Cano-Ortiz, Biondi in Cano-Ortiz et al. ex Cano-Ortiz, Biondi et Cano in Biondi et al. 2015 (5)

CHE-02 *Chenopodietalia* Br.-Bl. in Br.-Bl. et al. 1936

Winter-annual ruderal herb-rich vegetation on nutrient-rich disturbed soils of the Mediterranean and the Macaronesia

- *Chenopodietalia* Br.-Bl. 1931 (2b)
- *Chenopodietalia muralis* Br.-Bl. 1931 (phantom)
- *Chenopodietalia medioeuropaea* Tx. 1937 (34a)
- *Austro-Chenopodietalia* Rothmaler 1943 (2b)

CHE-02A *Chenopodion muralis* Br.-Bl. in Br.-Bl. et al. 1936

Mediterranean nutrient-demanding ruderal vegetation dominated by low-grown non-succulent herbs

- *Chenopodion murali* Br.-Bl. 1931 (orig.form) (2b)
- *Rudereto-Chenopodion* Rothmaler 1943 (orig.form) (2b, 3c)
- *Malvion parviflorae* (Rivas-Mart. 1978) S. Brullo in S. Brullo et Marcenò 1985 (syntax.syn.)
- *Vicion cordati-variae* Levon 1996 (syntax.syn.)

che05 Levon (1996) described a series of ruderal plant communities from the submediterranean Yalta (Crimean Peninsula) of which some were classified within the ecologically very heterogeneous *Vicion cordati-variae*. This alliance contains communities which should be classified either to the *Hordeion murini* Br.-Bl. in Br.-Bl. et al. 1936, presumably yet not described alliance of the *Geranio purpureae-Cardaminetalia hirsutae* and of the *Thero-Brometalia* (Rivas Goday et Rivas-Mart. ex Esteve 1973) de Bolòs 1975. Yet the *Atriplici prostratae-Chenopodietum urbici* (the nomenclatural type of the *Vicion cordati-variae*) should be classified within the *Chenopodion muralis* Br.-Bl. in Br.-Bl. et al. 1936 and hence the *Vicion cordati-variae* should be considered as synonym of the latter, until a large-synthesis of these communities reveals a better solution. (LM)

CHE-03 *Geranio purpureae-Cardaminetalia hirsutae* S. Brullo in S. Brullo et Marcenò 1985

Winter-annual fringe vegetation in shaded mesic habitats of the Mediterranean, winter-mild temperate (sub)atlantic and submediterranean regions of temperate Europe and the Macaronesia

che06 This syntaxonomic concept is recognized as a class in its own right by several Western European surveys (Rivas-Martínez et al. 2002a, 2002b; de Foucault 2009). It is a unit of transitional character, mediating between the therophytic grasslands of the winter-mild regions (the Mediterranean and its fringes) and open forests of those regions. Indeed, most of the species co-occurring in these communities come from these two species pools and only very few actually characterize this syntaxon exclusively. It may well be that these communities might have been one of natural sources of the species-rich annual (sub) mediterranean flora occupying ruderal and otherwise disturbed habitats today. (LM)

- *Cardamino hirsutae-Geranietalia purpureae* S. Brullo in S. Brullo et Marcenò 1985 *nom. invers. propos.* (42)
- *Urtico-Scrophularietalia peregrinae* S. Brullo in S. Brullo et Marcenò 1985 (5)
- *Bromo sterilis-Cardaminetalia hirsutae* de Foucault 2009 (syntax.syn.)
- *Urtico-Scrophularietalia peregrinae* S. Brullo ex Biondi, Blasi, Casavecchia et Gasparri in Biondi et al. 2014 (syntax.syn.)

MACARONESIAN AND WESTERN (SUB)MEDITERRANEAN GROUP OF ALLIANCES

CHE-03A *Geranio-Torilidion* Lohmeyer et Trautmann 1970

Mesic nitrophilous winter-annual fringe vegetation of the Macaronesia

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- *Senecionion tussilaginis* Oberd. 1965 (2b)
- *Galio aparines-Geranion purpurei* Lohmeyer 1975 (29)

CHE-03B *Geranio pusilli-Anthriscion caucalidis* Rivas-Mart. 1978

Mesic nitrophilous winter-annual fringe vegetation of the Atlantic seaboards of Northern Spain and France

- *Drabo muralis-Cardaminion hirsutae* de Foucault 1988
- *Anthrisco caucalidis-Cochlearion danicae* de Foucault 2009

CHE-03C *Allion triquetri* O. de Bolòs 1967

Mesic nitrophilous geophyte-rich fringe vegetation of the Western Mediterranean

- *Smyrnion olusatri* Rivas Goday 1964 (3b)

CHE-03D *Parietarion lusitanico-mauritanicae* Rivas-Mart. et al. 2002

Mesic shade-loving nitrophilous annual plant communities in the thermo- and mesomediterranean belts of the Western Mediterranean

- *Parietarion lusitanico-mauritanicae* Rivas-Mart. et al. 2001 (2b)

CENTRAL AND EASTERN (SUB)MEDITERRANEAN GROUP OF ALLIANCES

CHE-03E *Valantio muralis-Galion muralis* S. Brullo in S. Brullo et Marcenò 1985

Mesic subnitrophilous winter-annual fringe and wall vegetation of the Central and Eastern Mediterranean

che07 Rivas-Martínez et al. (2002b) considered this unit synonymous with the *Geranio pusilli-Anthriscion caucalidis* Rivas-Mart. 1978. (LM)

- *Stellario neglectae-Urticion membranaceae* Fanelli in Bianco et al. 2002 (syntax.syn.)

CHE-03F *Veronico-Urticion urentis* S. Brullo in S. Brullo et Marcenò 1985

Mesic subnitrophilous sciophilous weed vegetation of fertilized and irrigated citrus groves on alluvial soils of the Central Mediterranean

che08 Brullo et al. (2007) classified the *Veronico-Urticion urentis* within the *Urtico-Scrophularietalia*. (LM)

CHE-03G *Cardaminion graecae* Biondi, Pinzi et Gubellini in Biondi et al. 2013

Mesic nitrophilous winter-annual fringe vegetation of the Apennines

- *Cardaminion graecae* Biondi, Pinzi et Gubellini 2004 (5)

CHE-03H *Euphorbio taurinensis-Geranion lucidi* Matevski et Čarni in Mucina et al. 2009

Mesic nitrophilous winter-annual fringe vegetation of the submediterranean regions of the Balkan Peninsula

che09 For details of the nomenclature of this name see Mucina et al. (2009). (LM)

- *Euphorbio taurinensis-Geranion lucidi* Čarni 2001 (2b)

DIG *Digitario sanguinalis-Eragrostietea minoris* Mucina, Lososová et Šilc *class. nov. hoc loco*

Thermophilous grass-rich anthropogenic vegetation rich in summer-annual C4 species in the southern nemoral, mediterranean, steppe and semi-desert zones of Europe

dig01 This class is a novel syntaxonomic concept reflecting the special ecology of synanthropic communities dominated by C4 plants. These are not very common in Europe (Pyankov et al. 2010) and occur here prevalently in the Southern Europe experiencing prolonged periods of summer drought and high temperature (the Mediterranean) or, when in nemoral zone, then on substrates that drain and desiccate quickly. It is not surprising that major floristic components (e.g. some *Chenopodiaceae*, *Amaranthaceae*, *Euphorbiaceae* and *Poaceae*, especially subfamilies *Panicoideae* and *Chloridoideae*) are presumed to have originated in subtropical regions and today occur prevalently there and in the warm-temperate regions. Full description of the class and syntaxonomic comparisons to other ruderal and segetal vegetation will be published elsewhere. Here within, we describe the new class in a formal way and designate the *Eragrostietalia* J. Tx. ex Poli 1966 (Poli 1966: 60–74) as the *holotypus hoc loco* of the class and list the following species as diagnostic of the new class: *Amaranthus albus, A. blitoides, A. blitum, A. cripus, A. deflexus, A. graecizans, A. viridis, Bassia scoparia, Corispermum canescens, C. leptopterum, Cynodon dactylon, Digitaria ischaemum, D. sanguineum, Diplotaxis muralis, D. tenuifolia, Dysphania ambrosioides, D. botrys, D. multifida, Echinochloa colonum, E. crus-galli, Eleusine indica, Eragrostis barrelieri, E. minor, Erigeron bonariensis, Euphorbia chamaesyce, E. humifusa, E. maculata, E. prostrata, Heliotropium europaeum, Lepidium densiflorum* and others. (LM)

DIG-01 *Eragrostietalia* J. Tx. ex Poli 1966

Thermophilous grass-rich anthropogenous vegetation rich in C4 species on summer-dry sandy soils of Southern and Central Europe

- *Eragrostietalia* J.Tx. in Müller 1963 (2b)
- *Amarantho-Echinochloetalia* V. Solomakha et al. in V. Solomakha 1987 (syntax.syn.)
- *Conyzo canadensis-Brometalia tectorum* (Passarge 1988) Wollert et Dengler in Dengler et al. 2003 (syntax.syn.)

TEMPERATE SEGETAL ALLIANCES

DIG-01A *Spergulo arvensis-Erodion cicutariae* J.Tx. in Passarge 1964

Subthermophilous summer-annual weed vegetation on sandy and sandy-loamy soils of the atlantic to subcontinental regions in the nemoral zone of Europe

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- *Amaranthion* Tx. et Preising 1942 p.p. (1)
- *Polygonion tomentosi* Sissingh 1942 (1)
- *Panico-Setarion* Sissingh in Westhoff et al. 1946 (2b)
- *Digitario-Setarion* Sissingh in Westhoff et al. 1946 *nom. mut. propos.* (2b, *mut.illeg.*)
- *Panico-Setarion* Sissingh ex von Rochow 1951 *nom. ambig. rejic. propos.* (36)

dig02 The proposal to reject this name as *nomen ambiguum* was made by Lososová (in Chytrý 2009: 127). (LM)

- *Eu-Polygono-Chenopodion polyspermi* Tx. 1955 (2b)
- *Amarantho retroflexi-Setarion glaucae* V. Solomakha et al. in V. Solomakha 1987 (syntax.syn.)
- *Amarantho blitoidis-Echinochloion crus-galli* V. Solomakha 1988 (syntax.syn.)
- *Mercurialion annuae* Ries 1992 (5)

DIG-01B *Eragrostion* Tx. in Oberd. 1954

Thermophilous late-summer weed vegetation on sandy soils of southeastern Central Europe and the Balkan Peninsula

- *Amaranthion* Tx. et Preising 1942 p.p. (1)
- *Amarantho-Chenopodion albi* Morariu 1943 (3b)

dig03 Morariu (1943: 183) wrote (translated from Romanian): "Because of a lack of lot of important elements of the Mediterranean associations and a large number of species characteristic of different units in the Mediterranean region, the most appropriate name that we shall apply at least in our area is *Amarantho-Chenopodion albi*." Still on p. 182 the group of relevant communities carries the heading ' IV Al. *Diplotaxidion*' and the same name is used on pp. 202 and 212. I my view, the use of the name '*Amarantho-Chenopodion*' is only preliminary (not decisive) and hence the ICPN art. 3b applies. (LM)

- *Eragrostion minoris* Tx. in Slavnić 1944 (2b)
- *Eragrostidion* Oberd. 1949 (orig.form) (2b)
- *Eragrostion cilianensi-minoris* Tx. ex Oberd. 1954 (Rec.10C, 40)
- *Eragrostion poaeoides* Soó et Timár in Timár 1957 (orig. form) (phantom)
- *Tribulo-Eragrostion pooidis* Soó et Timár in Timár 1957 (syntax.syn.)
- *Tribulo-Eragrostion minoris* Soó et Timár 1957 *corr.* Soó 1980 (30, *corr.illeg.*)

DIG-01C *Consolido-Eragrostion pooidis* Soó et Timár in Timár 1957

Thermophilous late-summer weed vegetation on heavy soils of the Pannonian Basin

- *Consolido-Eragrostion minoris* Soó et Timár 1953 (phantom)
- *Consolido-Eragrostion pooidis* Soó et Timár 1954 (phantom)
- *Consolido-Eragrostion minoris* ('*pooidis*') Soó et Timár 1957 *corr.* Soó 1980 (orig.form) (*corr.illeg.*)

MEDITERRANEAN SEGETAL GROUP OF ALLIANCES

DIG-01D *Diplotaxion erucoidis* Br.-Bl. in Br.-Bl. et al. 1936

Weed vegetation on neutral to basic soils in the thermo- and mesomediterrannean belts of the Central and Western Mediterranean

- *Diplotaxion* Br.-Bl. 1931 (2b)
- *Heliotropion* Oberd. 1954 (syntax.syn.)
- *Calendulo arvensis-Heliotropion europaei* Trinajstić 2008 (2b, 5)

DIG-01E *Chenopodion botryos* S. Brullo et Marcenò 1980

Weed vegetation on sandy acidic and nutrient-poor soils in the thermo- and mesomediterrannean belts of Sicily

RUDERAL GROUP OF ALLIANCES

DIG-01F *Salsolion ruthenicae* Philippi ex Oberd. 1983

Ruderal vegetation on disturbed gravelly and sandy soils of the subcontinental regions of Central Europe

- *Salsolion ruthenicae* Philippi 1971 (2b)
- *Conyzo-Bromion tectorum* Passarge 1978 (2b)
- *Conyzo-Senecionion viscosi* Eliáš 1986 (3b)
- *Eragrostio-Amaranthion crispi* Mucina 1991 (2b)

DIG-01G *Tamarici ramosissimae-Salsolion australis* Golub 1994

Ruderal vegetation on disturbed sand dunes of the Northern Caspian region

dig04 Golub & Savchenko (1986) and Golub (1994) classified this unit within the desert vegetation (*Artemisietea lerchianae*). However, as also shown by the synoptic table of Golub & Savchenko (1986: Tab. I), the '*Salsoletum australis*' (the representative association of the alliance) shows very little in common with the *Artemisietea lerchianae*. (LM)

- *Salsolion australis* Golub et Savchenko 1986 (2b, 5)
- *Salsolion australis* Golub 1987 (1)

DIG-02 *Euphorbietalia prostratae* Vicedo et al. 1997

Summer-dry trampled vegetation on sandy soils in the southern nemoral and mediterranean zones of Europe

DIG-02A *Euphorbion prostratae* Rivas-Mart. 1976

Summer-dry vegetation on trampled sandy soils of the Iberian Peninsula, the Balearic Islands and the Macaronesia

- *Chamaesycion prostratae* Rivas-Mart. 1976 *nom. mut. propos.* (45)

dig05 Rivas-Martínez et al. (2002a: 254) formally suggested this name change. This proposal appears superfluous in the light of current taxonomy of the genus *Chamaesyce,* placing this taxon within *Euphorbia* (see Govaerts et al. 2000). (LM)

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• *Eleusinion indicae sensu* O. de Bolòs 1988, *non* Léonard 1952 (pseudonym)

dig06 The *Eleusinion indicae* Léonard 1954 (originally described from tropical Africa) has been erroneously applied by de Bolòs (1988) to a group of trampled thermophilous communities of the Western Mediterranean. (LM)

DIG-02B *Polycarpo-Eleusinion indicae* Čarni et Mucina 1998

Summer-dry vegetation of sandy trampled habitats of Northern Italy and the Illyrian region

DIG-02C *Eragrostio-Polygonion arenastri* Couderc et Izco ex Čarni et Mucina 1998

Summer-dry trampled vegetation on sandy soils of Western and Central Europe

• *Eragrostion minoris* Pott 1995 (31)
• *Digitario sanguinalis-Polygonion avicularis* de Foucault 2010 (syntax.syn.)

POL *Polygono-Poetea annuae* Rivas-Mart. 1975

Subcosmopolitan therophyte-rich dwarf-herb vegetation of trampled habitats

pol01 Theurillat et al. (1995) suggested classifying the contents of this syntaxon as a subclass within the *Stellarietea mediae*. (LM)

• *Coronopodo-Polygonetea avicularis* Lohmeyer 1970 (3b)
• *Polygono-Poetea annuae* Rivas-Mart. in Géhu 1973
• *Polygono arenastri-Poetea annuae* Rivas-Mart. 1975 *corr*. Rivas-Mart. et al. 1991

POL-01 *Polygono arenastri-Poetalia annuae* Tx. in Géhu et al. 1972 *corr*. Rivas-Mart. et al. 1991

Subcosmopolitan therophyte-rich dwarf-herb vegetation of trampled habitats

pol02 In order to give this unit an ecological and floristic meaning distinct from other classes, the *Eragrostio-Polygonion arenastri, Euphorbion prostratae* and *Polycarpo-Eleusinion indicae*, should be placed here. (JD) This step would go against the 'ecological and floristic meaning' of the *Polygono arenastri-Poetalia annuae*, but especially against the logic underpinning the drivers of vegetation patterns dominated by C4 plants (Čarni & Mucina 1998). (LM)

• *Coronopodo-Polygonetalia* Lohmeyer 1970 (3b)
• *Polygono-avicularis-Poetalia annuae* Tx. in Géhu et al. 1972 (orig.form) (43)
• *Poo annuae-Polygonetalia arenastri* Tx. in Géhu et al. 1972 *corr*. Rivas-Mart. et al. 1991 *nom. invers. propos.* (*invers. illeg*.)

pol03 Merit of this inversion remains elusive. (LM)

• *Bryo-Saginetalia procumbentis* Vicedo, Gomis, Alonso et de la Torre 1997 (syntax.syn.)
• *Sagino apetalae-Polycarpetalia tetraphylli* de Foucault 2010 (syntax.syn.)

pol04 The presumed geographic exclusivity of the orders (*Polygono arenastri-Poetalia annuae* and *Sagino apetalae-Polycarpetalia tetraphylli*) recognized by de Foucault (2010b) is unconvincing. Moreover, the latter order comprises three alliances of which one is dominated by C3 herbs, while the other two by C4 grasses and herbs. De Foucault (2010b) failed to consider the paper by Čarni & Mucina (1998) that had discussed this issue in detail. (LM)

POL-01A *Polygono-Coronopodion* Sissingh 1969

Herb-rich vegetation in trampled habitats in the temperate to boreal zones of Europe

• *Polygonion avicularis* Br.-Bl. 1931 (2b)
• *Polygonion avicularis* Aichinger 1933 *nom. ambig. rejic. propos.* (36)

pol05 This name was suggested for rejection as *nomen ambiguum* (Lososová in Chytrý 2009: 195, 197). (LM)

• *Polygonion avicularis* Nordhagen 1936 (phantom)
• *Polygonion avicularis* Nordhagen 1937 (2b)
• *Coronopodo-Polygonion* Sissingh 1969 *nom. invers. propos.* (42)

pol06 The formal proposal to introduce a *nomen inversum* was made by Láníková in Chytrý (2009: 46). (LM)

• *Poion annuae* Mititelu et Barabaş 1972 (syntax.syn.)
• *Matricario matricarioidis-Polygonion avicularis* Rivas-Mart. 1975 (syntax.syn.)
• *Sclerochloo-Coronopodion squamati* Rivas-Mart. 1975 (syntax.syn.)
• *Chamomillo-Polygonion avicularis* Ladero et al. 1981 (phantom)
• *Chamomillo suaveolentis-Polygonion arenastri* Rivas-Mart. 1975 *corr*. Rivas-Mart. et al. 1991 (30, *mut.illeg*.)
• *Matricario matricarioidis-Polygonion arenastri* Rivas-Mart. 1975 *corr*. Rivas-Mart. et al. 1991 (45)

POL-01B *Polycarpion tetraphylli* Rivas-Mart. 1975

Herb-rich vegetation in trampled sunny habitats of the Mediterranean

POL-01C *Saginion procumbentis* Tx. et Ohba in Géhu et al. 1972

Herb-rich vegetation in strongly trampled shady habitats of Europe

• *Marchantio-Saginion* Szabó 1971 (syntax.syn.)
• *Sagino-Marchantion* Szabó 1971 *nom. invers. propos.* (*invers.illeg*.)

pol07 Merit of this name inversion is dubious. (LM)

ART *Artemisietea vulgaris* Lohmeyer et al. in Tx. ex von Rochow 1951

Perennial (sub)xerophilous ruderal vegetation of the temperate and submediterranean regions of Europe

art01 The *Artemisietea vulgaris* unites ruderal plant communities composed of short-lived perennial and hapaxanthic pauciennial species (with considerable admixture of

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seasonally appearing winter or summer annuals). These communities (especially the *Onopordetalia acanthii*) occur in broad geographic (macroclimatic) ecotones between the nemoral (forest deciduous) forest-steppe (e.g. in the Pannonian Basin), dry steppic enclaves of the Western and Central Europe (here associated with particularly dry soils). Within the forest-steppe and steppe zones they are also associated with dry and disturbed nutrient-rich soils, usually in places enjoying high insolation and local warm microclimate (*'Polygono-Artemisietea austriacae'*). The communities of this class are a common sight in the submediterranean regions (with a pronounced summer-dry period) while in the Mediterranean proper these communities occur at higher elevation (*Carthametalia lanati*), associated with intensively used (disturbed) grasslands. We classify also the semi-ruderal (heavily disturbed) ruderal grasslands (*Agropyretalia intermedio-repentis* and *Elytrigio repentis-Dittrichietalia viscosi*) within the *Artemisietea vulgaris* rather than recognized as within a class in its own right. (LM)

- *Ruderali-Secalietea* Br.-Bl. et al. 1936 p.p. (3f)
- *Artemisietea vulgaris* Lohmeyer et al. in Tx. 1950 (2b)
- *Chenopodietea* Br.-Bl. 1951 (2b)
- *Onopordetea acanthii* Br.-Bl. 1964 (2b)
- *Onopordo-Sisymbrietea* Görs 1966 p.p. (35)
- *Agropyretea intermedii* Oberd. et al. 1967 (phantom)
- *Agropyretea repentis* Oberd.,T. Müller et Görs in Oberd. et al. 1967 (2b)
- *Onopordetea acanthii* Br.-Bl. 1967 (syntax.syn.)
- *Agropyretea intermedio-repentis* T. Müller et Görs 1969 (syntax.syn.)
- *Onopordetea acantho-nervosi* Rivas-Mart. 1975 (syntax. syn.)
- *Inuletea viscosae* Trinajstić 1978 (2b)
- *Meliloto-Artemisietea absinthii* Eliáš 1980 (phantom)
- *Meliloto-Artemisietea absinthii* Eliáš 1981 (syntax.syn.)
- *Polygono-Artemisietea austriacae* Mirkin, Sakhapov et Solomeshch in Mirkin et al. 1986 (1)
- *Polygono-Artemisietea austriacae* Mirkin, Sakhapov et Solomeshch in A. Ishbirdin et al. 1988 (syntax.syn.)
- *Polygono-Artemisietea austriacae* Mirkin, Sakhapov et Solomeshch in Mirkin et al. 1989 (2b)

TEMPERATE GROUP OF ORDERS

ART-01 *Onopordetalia acanthii* Br.-Bl. et Tx. ex Klika et Hadač 1944

Subxeric ruderal vegetation dominated by short-lived perennials of temperate Europe

- *Onopordetalia acanthii* Br.-Bl. et Tx. 1943 (2b)
- *Artemisietalia vulgaris* Lohmeyer in Tx. 1947 (2b)
- *Artemisietalia vulgaris* Oberd. 1949 (2b)
- *Onopordetalia acanthii* Br.-Bl. et Tx. ex von Rochow 1951 (31)
- *Onopordetalia acantho-nervosi* Rivas-Mart. 1975 (29)
- *Meliloto-Artemisietalia absinthii* Eliáš 1979 (5)
- *Meliloto-Artemisietalia absinthii* Eliáš 1981 (syntax.syn.)
- *Bromo tectorum-Onopordetalia acanthii* Ubaldi 2011 (29)

ART-01A *Onopordion acanthii* Br.-Bl. et al. 1936

Thistle-dominated xero-mesophytic ruderal vegetation of subcontinental Central Europe and the Northern Balkans

- *Onopordion* Br.-Bl. 1926 (2b)
- *Hordeo-Onopordion acanthi* Libbert 1932 (29)
- *Marrubion peregrini* Slavnić 1951 (syntax.syn.)
- *Artemision absinthii* Lakušić et al. 1975 (2b)
- *Artemision absinthii* Lukašić et al. 1978 (orig.form) (phantom)
- *Artemision absinthii* Eliáš 1979 (2b)
- *Artemision absinthii* Eliáš (1979) 1980 (orig.form) (phantom)
- *Potentillo-Artemision absinthii* Eliáš 1981 (syntax.syn.)
- *Cirsio eriophori-Verbascion* Eliáš 1986 (3b)
- *Cirsion candelabri* Redžić et al. 2011 (2b, 5)
- *Bromo tectorum-Onopordion acanthii* Ubaldi 2011 (2b, 5)

ART-01B *Dauco-Melilotion* Görs ex Rostański et Gutte 1971

Xero-mesophytic ruderal vegetation dominated by biennial plants of temperate and subboreal Europe

- *Dauco-Melilotion* Görs 1966 (2b)
- *Dauco-Melilotion* Görs in Oberd. et al. 1967 (2b)
- *Tussilaginion* Szabó 1971 (syntax.syn.)

ART-01C *Cirsion richterano-chodati* (Rivas-Mart. in Rivas-Mart. et al. 1984) Rivas-Mart. et al. 1991

Cantabro-Pyrenean thistle-dominated high-altitude ruderal vegetation

- *Cirsion richterano-chodati* (Rivas-Mart. in Rivas-Mart. et al. 1984) Mucina 1991 (2b, 5)

ART-01D *Carduo carpetani-Cirsion odontolepidis* Rivas-Mart. et al. 1986

Central Iberian thistle-dominated high-altitude ruderal vegetation

- *Carduo carpetani-Cirsion odontolepidis* Rivas-Mart. in Ladero Alvarez et al. 1983 (2b)
- *Verbascion nevadensis* Esteve et M. López 1973 (2b, 3b)

ART-01E *Medicagini falcatae-Diplotaxion tenuifoliae* Levon 1997

Crimean submediterranean xero-mesophytic ruderal vegetation in sunny habitats

ART-02 *Polygono-Artemisietalia austriacae* Sakhapov et Solomeshch in A. Ishbirdin et al. 1988

Semianthropogenic heavily-grazed disturbed grasslands and herblands in the forest-steppe and steppe zones of Eastern Europe

art02 This vegetation comprises semi-anthropogenic (semi-ruderal) herb-rich grassland communities derived through processes of overuse (uncontrolled grazing and trampling, leading to disturbance of soil surface) of the steppe

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communities of the *Festuco-Brometea*. Mirkin et al. (1986) ineffectively and Ishbirdin et al. (1988) effectively described the *Polygono avicularis-Artemisietalia austriacae* from Bashkortostan. This syntaxonomic concept is supposed to apply to similar vegetation in other regions of the steppe zone of southeastern Ukraine, Southern Russia and Northern Kazakhstan. (LM)

- *Polygono-Artemisietalia austriacae* Sakhapov et Solomeshch in Mirkin et al. 1986 (1)
- *Polygono-Artemisietalia austriacae* Sakhapov et Solomeshch in Mirkin et al. 1989 (2b)

ART-02A *Bassio-Artemision austriacae* Solomeshch in A. Ishbirdin et al. 1988

Sub-anthropogenic heavily-grazed disturbed grasslands and herblands in the forest-steppe and steppe zones of Eastern Europe

- *Bassio-Artemision austriacae* Solomeshch in Mirkin et al. 1986 (1)
- *Alysso-Artemision austriacae* Solomeshch in Mirkin et al. 1986 (*sensu* Mirkin et al. 1989) (phantom)
- *Alysso-Artemision austriacae* Solomeshch in Mirkin et al. 1989 (5)
- *Helictotricho-Ceratocarpion arenarii* Saitov 1989 (1)

ART-03 *Agropyretalia intermedio-repentis* T. Müller et Görs 1969

Semiruderal grasslands and herblands and weed segetal vegetation of perennial crops in the nemoral, forest-steppe and subboreal zones of Europe

art03 Some national and regional vegetation surveys use this order as a basis for a class in its own right – the *Agropyretea repentis* or the *Agropyretea intermedii-repentis* (*e.g.* Korotkov et al. 1991; Solomakha 1995; Theurillat et al. 1995). Bardat et al. (2004) classify this order in the *Agropyretea pungentis* (syn. of the *Juncetea maritimi*). (LM)

- *Agropyretalia repentis* Oberd. et al. 1967 (2b)
- *Elytrigietalia repentis* Oberd. et al. 1967 *nom. mut. propos.* (2b, *mut.illeg.*)

art04 Rivas-Martínez et al. (2002a: 258) published the formal proposal serving this name change. (LM)

- *Agropyretalia intermedio-repentis* Oberd.,T. Müller et Görs 1967 (phantom)
- *Elytrigietalia intermedio-repentis* T. Müller et Görs 1969 *nom. mut. propos.* (45)

art05 The formal suggestion to mutate this name was published by Rivas-Martínez et al. (2011: 239). (LM)

- *Achilleetalia millefolii* Abramova et Rudakov in Mirkin et al. 1985 (syntax.syn.)
- *Agropyretalia intermedio-cristati* Passarge 1989 (2b)
- *Gypsophilo-Erigeralia acrii* Smetana et al. 1997 (orig.form) (2b, 5)
- *Rubo caesii-Calamagrostietalia epigeji* Dengler et Wollert in Dengler et al. 2003 (syntax.syn.)

GROUP OF SEMIRUDERAL ALLIANCES

ART-03A *Convolvulo arvensis-Agropyrion repentis* Görs 1967

Semiruderal grasslands and herblands in the nemoral and subboreal zones of Europe

- *Gageo pratensis-Allion schoenoprasi* Passarge 1964
- *Convolvulo arvensis-Elytrigion repentis* Görs 1967 *nom. mut. propos.* (45)

art06 Láníková in Chytrý (2009: 258) and later in Rivas-Martínez et al. (2011: 240) formally suggested this name change. (LM)

- *Calamagrostio-Elytrigion* Doing 1974 (2b)
- *Convolvulo arvensis-Elytrigion* Doing 1974 (2b)
- *Convolvulo arvensis-Elytrigion repentis* Görs 1966 *nom. mut. propos. (mut.illeg.)*

art07 Rivas-Martínez et al. (2002a: 256) formally suggested this name change. (LM)

- *Falcario vulgaris-Poion angustifoliae* Passarge 1989 (syntax.syn.)
- *Poion compressae* T. Müller et Görs ex Dengler et Wollert in Dengler et al. 2003 (syntax.syn.)
- *Rubo caesii-Calamagrostion epigeji* (Dengler 1997) Dengler et Wollert in Dengler et al. 2003 (syntax.syn.)
- *Equiseto ramosissimi-Elytrigion campestris* Felzines 2011 (syntax.syn.)

ART-03B *Artemisio absinthii-Agropyrion intermedii* T. Müller et Görs 1969

Semiruderal steppic grasslands of dry continental valleys of the Alps

- *Artemisio-Agropyrion intermedii resp. truncati* Soó 1964 (orig.form) (2b)
- *Artemisio absinthii-Elytrigion intermedii* T. Müller et Görs 1969 *nom. mut. propos.* (45)
- *Gypsophilo paniculatae-Agropyrion repentis* Borhidi, Csiky, Lájer et Pál in Borhidi et al. 2012 (syntax.syn.)

ART-03C *Artemisio marschallianae-Elytrigion intermedii* Korotchenko et Didukh 1997

Semiruderal secondary calcicolous steppic grasslands on steep slopes in the forest-steppe zone of Ukraine and southeastern Russia

ART-03D *Rorippo austriacae–Falcarion vulgaris* Levon 1997

Semiruderal meso-xerophytic steppic vegetation of Crimea

GROUP OF SEGETAL WEED ALLIANCES

ART-03E *Trifolio-Medicaginion sativae* Balázs 1944

Perennial weed vegetation of perennial animal fodder crops on nutrient-rich soils in the nemoral zone of Central Europe

- *Veronico politae-Taraxacion* Kropáč et Hadač in Kropáč et al. 1971 (syntax.syn.)

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ART-03F *Achilleion millefolii* Abramova et Rudakov in Mirkin et al. 1985

Perennial weed vegetation of perennial crops of the steppe and forest-steppe zones of European Russia

SUBMEDITERRANEAN GROUP OF ORDERS

ART-04 *Carthametalia lanati* S. Brullo in S. Brullo et Marcenò 1985

Thistle-dominated ruderal vegetation on disturbed calcareous substrates of the submediterranean regions of Southern Europe

ART-04A *Silybo mariani-Urticion piluliferae* Sissingh ex Br.-Bl. et O. de Bolòs 1958

Thistle-dominated ruderal vegetation of the Central Mediterranean

- *Silybo-Urticion* Sissingh 1950 (2b)
- *Urtico piluliferae-Silybion mariani* Sissingh ex Br.-Bl. et O. de Bolòs 1958 *nom. invers. propos.* (42)

art08 The formal suggestion to invert the name was published by Rivas-Martínez et al. (2011: 243) and is apparently motivated by the invariably dominating *Silybum marianum* in the stands of the communities of this alliance. (LM)

- *Silybion mariani* Rivas-Mart. in Rivas-Mart. et al. 1992 (syntax.syn.)

ART-04B *Onopordion castellani* Br.-Bl. et O. de Bolòs 1958 *corr*. Rivas-Mart. et al. 2001

Thistle-dominated ruderal vegetation of the Iberian Peninsula

- *Onopordion arabici* Br.-Bl. et O. de Bolòs 1958 (orig.form)
- *Scolymo-Kentrophyllion* Rivas Goday 1964 (3d)
- *Onopordion nervosi* Br.-Bl. et O. de Bolòs 1958 *corr*. Rivas-Mart. 1975 (43)
- *Scolymo-Carthamion lanati* (Rivas Goday 1964) Ladero et al. 1981 (2b, 5)
- *Onopordion gautieri* Br.-Bl. et O. de Bolòs 1958 *nom. corr. propos.* (43)

ART-04C *Onopordion illyrici* Oberd. 1954

Thistle-dominated ruderal vegetation of the submediterranean regions of the Balkans

ART-04D *Scolymion hispanici* Morariu 1967

Thistle-dominated ruderal vegetation of the Black Sea seaboards

ART-05 *Elytrigio repentis-Dittrichietalia viscosae* Mucina *ined.*

Anthropogenic sub-ruderal and ruderal grasslands and herblands of submediterranean and mediterranean Southern Europe

art09 The formal description of this unit will be presented elsewhere. (LM)

- *Inuletalia viscosae* Trinajstić 1978 (2b)

art10 This name is invalid as the only alliance (*Inulion viscosae* Trinajstić 1978) classified within this order was invalidly published. The only association (‘*Helichryso-Inuletum viscosae* Trinajstić 1965’) was not effectively published in 1965 and it has not been validated in Trinajstić (1978) either. (LM)

ART-05A *Inulo viscosae-Agropyrion repentis* Biondi et Allegrezza 1996

Anthropogenic sub-ruderal and ruderal grasslands and herblands of the submediterranean regions of the Apennine and Balkan Peninsulas

- *Inulion viscosae* Trinajstić 1978 (2b)
- *Dittrichio viscosae-Elytrigion repentis* Biondi et Allegrezza 1996 *nom. mut. propos.* (45)

ART-05B *Arundion collinae* S. Brullo, Giusso, Guarino et Sciandello in S. Brullo et al. 2010

Thermomediterranean sub-ruderal perennial terrestrial reed on wet clayey soils of the Southern Apennine Peninsula, Sicily, Hellas and Crete

ART-05C *Bromo-Oryzopsion miliaceae* O. de Bolòs 1970

Thermomediterranean sub-ruderal perennial grasslands on disturbed road verges of the Mediterranean

art11 The position of this alliance is contentious. Rivas-Martínez et al. (1999) placed this alliance in the *Agropyretalia repentis* and only three years later Rivas-Martínez (2002b: 474) re-classified this unit within the *Carthametalia lanati*. Biondi et al. (2001) gave preference to the *Brachypodio ramosi-Dactylidetalia* (syn. of the *Thero-Brachypodietalia* in our system). In any case, these conflicting opinions have been obviously motivated by the transitional character of the unit that straddles the border between pseudosteppes and ruderal grass-rich vegetation. (LM)

- *Bromo-Piptatherion miliaceae* O. de Bolòs 1970 *nom. mut. propos.* (45)

art12 Rivas-Martínez et al. (2002a: 252; 2011: 244) formally suggested this name change. It may not be the most fortunate deed since recent molecular studies have shown that ‘*Oryzopsis miliacea*’ does not belong either in *Oryzopsis* or in *Piptatherum s.str.* (Romaschenko et al. 2011). (LM)

ART-05D *Hyperico perforati-Ferulion communis* Vicente Orellana et Galán de Mera 2008

Tall-herb ruderal communities of managed disturbed habitats in the meso- to supramediterranean belts of the Iberian Peninsula

art13 Vicente Orellana & Galán de Mera (2008) placed this alliance within the *Agropyretalia*. (LM)

EPI *Epilobietea angustifolii* Tx. et Preising ex von Rochow 1951

Tall-herb semi-natural perennial vegetation on disturbed forest edges, nutrient-rich riparian fringes an in forest clearings in the temperate and boreal zones of Eurasia

epi01 Dengler et al. (2007) included the contents of the *Epilobietea angustifolii* (as a subclass – the *Senecioni sylvatici-Epilobienea angustifolii*) into a broadly conceived *Artemisietea vulgaris*, but excluded the communities of wet sites (*Convolvuletalia sepium*). (LM)

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- *Epilobietea angustifolii* Tx. et Preising in Tx. 1950 (2b)
- *Epilobietea angustifolii* Tx. et Preising in Br-Bl. et al. 1952 (31)
- *Urtico-Cirsietea* Doing 1963 (2b)
- *Galio-Urticetea* Passarge 1967 (3b)
- *Galio-Urticetea* Passarge ex Kopecký 1969 (syntax.syn.)

epi02 The incorporation of the *Galio-Urticetea* that became a widely accepted class concept all over the Central Europe (see for instance Mucina 1993b; Berg et al. 2001, 2004; Jarolímek et al. 1997; Chytrý 2009; Borhidi et al. 2012 etc.) into the *Epilobietea angustifolii* is an unusual and bold step recognizing the ecological and floristic similarity among the ruderal (both anthropogenic and natural) communities of nutrient-rich, well moistened soils. (LM)

- *Galio aparines-Urticetea maioris* Passarge ex Kopecký 1969 (orig.form) (*sensu* Rivas-Martínez et al. 2011: 250) (phantom)
- *Chamaenerietea* Mititelu et Barabaş 1972 (syntax.syn.)
- *Galeopsio-Senecionetea sylvatici* Passarge 1981 (3b)
- *Filipendulo ulmariae-Convolvuletea sepium* Géhu et Géhu-Franck 1987 (2b)

epi03 Some recent syntaxonomic schemes (Géhu & Géhu-Franck 1987; Theurillat et al. 1995; Stortelder et al. 1999a, 1999b; Bardat et al. 2004; Berg et al. 2004; de Foucault 2011) suggest to exclude the *Filipendula*-rich tall-herb stands of fallow wet meadows and along ditches from the *Molinio-Arrhenatheretea* (which would then be restricted to mown, grazed or trampled communities) and combine these with the *Convolvuletalia sepium* currently within the *Epilobietea angustifolii*) and the *Petasito-Chaerophylletalia* (currently within the *Mulgedio-Aconitetea*) into a class in its own right – the *Filipendulo-Convolvuletea*. However, the class name has only been published invalidly by Géhu & Géhu-Franck (1987) and not yet validated. (JD) De Foucault (2011) chose the *Convolvuletalia sepium* as the type of the *Filipendulo-Calystegietea*. (LM) Some authors (LM, MC, MV) do not recognize the logic of lumping eutrophic synanthropic fringe communities (*Convolvuletalia sepium*) with the natural tall-herb communities of the meadows fringes classified as the *Filipenduletalia* (here included into the *Molinietalia*) and the eutrophic natural high-altitude tall-herb riparian communities (*Petasito-Chaerophylletalia*). Through the typification of the *Galio-Urticetea* by choosing *Convolvuletalia sepium* as the *typus nominis* and choosing the latter order as the types of the *Filipendulo-Calystegietea*, the latter class becomes a synonym of the *Galio-Urticetea* and hence of the *Epilobietea angustifolii*. (LM)

- *Convolvulo sepium-Filipenduletea* Géhu et Géhu-Franck 1987 *nom. invers. propos.* (2b, *invers.superfl.*)
- *Filipendulo ulmariae-Calystegietea sepium* Géhu et Géhu-Franck 1987 *nom. mut. propos.* (orig.form) (in Julve 1993) (2b, *mut.superfl.*)
- *Lythro salicariae-Calystegietea sepium* Klauck 1992 (syntax.syn.)
- *Circaeo-Stachyetea* Ubaldi 2011 (2b)

EPI-01 *Galeopsio-Senecionetalia sylvatici* Passarge 1981 *nom. conserv. propos.*

Tall-herb perennial semi-natural vegetation on acidic soils on forest margins and clearings of the Eurosiberian Region

epi04 In case the *Atropetalia* Tx. 1947 would be rejected as a *nomen ambiguum* (see Dengler et al. 2007: 120), this name should become conserved in order to stabilize the nomenclature. (LM)

- *Atropetalia* Vlieger 1937 (2b)
- *Atropetalia* Tx. 1947 *nom. ambig. rejic. propos.* (36)

epi05 The proposal to reject this name was submitted by Dengler et al. (2007: 120). (LM)

- *Epilobietalia angustifolii* (Vlieger 1937) Tx. 1950 (2b)
- *Chamaenerietalia angustifolii* (Vlieger 1937) Tx. 1950 *nom. mut. propos.* (2b, *mut.superfl.*)
- *Chamaenerietalia* Mititelu et Barabaş 1972 (syntax.syn.)

EPI-01A *Epilobion angustifolii* Oberd. 1957

Tall-herb perennial semi-natural vegetation on acidic soils of forest margins and in forest clearings in the boreal and nemoral zones of Europe

epi06 Dengler et al. (2007: 120) preferred this name to be the valid designation of this syntaxon in case of the rejection of *Atropion* Tx. 1947 as a *nomen ambiguum*. (LM)

- *Epilobion angustifolii* Rübel 1933 (2b)
- *Epilobion angustifolii* Soó 1933 (2b)
- *Chamaenerion angustifolii* Soó 1933 *nom. mut. propos.* (2b, *mut.superfl.*)
- *Atropion* Tx. 1937 *nom. ambig. rejic. propos.* (36)

epi07 The name *Atropion* (or *Atropion bellae-donnae*) has been widely and often misleadingly used for forest-clearing communities on both nutrient-rich and nutrient-poor substrates. Accordingly, the *Atropion* Tüxen 1947 should be rejected as *nomen ambiguum* (see also Dengler et al. 2007: 120 and the Remark for the name *Atropion bellae-donnae* Aichinger 1933). (LM)

- *Carici piluliferae-Epilobion angustifolii* Tx. 1950 (2b)
- *Epilobion angustifolii* Tx. ex von Rochow 1951 (31)
- *Epilobion angustifolii* Eggler 1952 (2b)
- *Galeopsio-Senecionion sylvatici* Passarge 1981 (29)
- *Mycelido-Senecionion sylvatici* Passarge 1981 (syntax.syn.)
- *Rumici-Avenellion flexuosae* Passarge 1984
- *Pteridion aquilini* Fukarek 1969 (2b, 3b)
- *Prenanthion purpureae* Julve 1993 (2b)
- *Holco mollis-Pteridion aquilini* Passarge (1994) 2002 (syntax.syn.)

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- *Holco mollis-Pteridion aquilini* (Passarge 1964) Rameau in Bardat et al. 2004 (3b)
- *Pteridion aquilini* Milosavljević et al. 2008 (2b)

EPI-01B *Linarion niveae* Rivas-Mart. 1964

Tall-herb perennial subspontaneous vegetation on acidic soils of forest margins and clearings of the submediterranean Iberian Peninsula

EPI-02 *Circaeo lutetianae-Stachyetalia sylvaticae* Passarge 1967 *nom. conserv. propos.*

Ruderal and semi-natural fringe mesic tall-herb vegetation of tall-herbs on nutrient- and base-rich soils of cool-temperate and submediterranean Europe

epi08 See the proposal to this effect by Dengler et al. (2007: 122). (LM)

- *Epilobietalia angustifolii* Tx. ex von Rochow 1951 *nom. ambig. rejic. propos.* (36)

epi09 See the proposal to this effect by Dengler et al. (2007: 122). (LM)

- *Parietarietalia officinalis* Boşcaiu et al. 1964 (phantom)
- *Galio-Parietarietalia officinalis* Boşcaiu, Gergely et Codoreanu in Raţiu et al. 1966 *nom. rejic. propos.* (36)

epi10 We submit this name to be considered as *nomen rejicientum* against the more frequently used valid name *Circaeo lutetianae-Stachyetalia sylvaticae* Passarge 1967 *nom. conserv. propos.* (LM, JPT)

- *Lamio albi-Chenopodietalia boni-henrici* Kopecký 1969 (2b)

epi11 Rivas-Martínez et al. (2011) claim that his order was typified by the *Rumicion alpini*. (LM)

- *Glechometalia hederaceae* Tx. in Tx. et Brun-Hool 1975 (syntax.syn.)
- *Agropyro-Glechometalia* Passarge 1978 (29)
- *Impatienti noli-tangere-Stachyetalia sylvaticae* Boullet et al. in Bardat et al. 2004 (syntax.syn.)

EPI-02A *Fragarion vescae* Tx. ex von Rochow 1951 *nom. conserv. propos.*

Semi-ruderal herb-rich clearing vegetation on nutrient-rich calcareous soils in the nemoral zone of Central and Western Europe

epi12 We propose to conserve this name that would replace the *Atropion bellae-donnae* Aichinger 1933 after the latter is considered a *nomen ambiguum*. (LM)

- *Atropion* Br.-Bl. 1930 (2b)
- *Atropion* Aichinger 1933 *nom. ambig. rejic. propos.* (36)

epi13 The original diagnosis of the *Atropion bellae-donnae* (Aichinger 1933) includes a single association, the *Atropo bellae-donnae-Epilobietum angustifolii* Aichinger 1933, which is oligotrophic and slightly nitrophilous. Thus the name *Atropion bellae-donnae* Aichinger 1933 cannot be used for this type vegetation of nutrient-rich soil, as it is commonly found in the literature. It should be considered as *nomen ambiguum* (see Petřík et al. in Chytrý 2009: 382). (MC, JD, LM)

- *Fragarion vescae* Tx. 1950 (2b)
- *Atropion* Br.-Bl. ex Br.-Bl. et al. 1952 (31)
- *Atropion* Br.-Bl. ex Oberd. 1957 (31)
- *Dactylido-Aegopodion* Passarge 1967 (syntax.syn.)

epi14 The only association that can be considered as the *typus* of this alliance is the '*Arctietum nemorosi* Tx (1931) 1950' (see Passarge 1967). The *Dactylido-Aegopodion* is the *holotypus* of the *Circaeo-Stachyetalia*. (LM)

- *Mycelido-Stachyion* Passarge (1967) 1978 (29)

EPI-02B *Impatienti noli-tangere-Stachyion sylvaticae* Görs ex Mucina 1993

Semi-ruderal tall-herb vegetation of shaded mesic forest margins and clearings on loamy soils in the colline and submontane belts of Central Europe

- *Impatienti noli-tangere-Stachyion sylvaticae* Görs 1974 (3b)

EPI-02C *Aegopodion podagrariae* Tx. 1967 *nom. conserv. propos.*

Semi-ruderal herb-rich clearing vegetation on mesic margins and clearings of forests and scrub in the temperate and subboreal zones of Europe

epi15 The conservation of this name was suggested in Catteau et al. (2010). (LM)

- *Parietarion officinalis* Boşcaiu et al. 1964 (phantom)
- *Parietarion officinalis* Boşcaiu, Gergely et Codoreanu in Raţiu et al. 1966 *nom. rejic. propos.*

epi16 We submit this name to be considered as *nomen rejicientum* against the more frequently used valid name *Aegopodion podagrariae* Tx. 1967 *nom. conserv. propos.* (LM, JPT)

- *Sambucion ebuli* Eliáš 1979 (syntax.syn.)

EPI-03 *Arctio lappae-Artemisietalia vulgaris* Dengler 2002

Ruderal vegetation dominated by short-lived perennials on mesic loamy soils of the low-altitude cool-temperate Central Europe and at high-altitudes of submediterranean Europe

- *Lolio-Arctietalia* Knapp 1948 (2b)
- *Chenopodio-Arctietalia* Oberd. et al. 1967 (2b)

EPI-03A *Arction lappae* Tx. 1937

Ruderal vegetation of short-lived perennials on mesic loamy soils of cool-temperate Europe

epi17 This alliance has a transitional position between the *Artemisietea* and *Epilobietalia angustifolii* and therefore an alternative classification within the *Artemisietea* is also possible. (MC, LM)

- *Rumicion obtusifolii* Gutte 1972 (syntax.syn.)
- *Cirsio-Elytrigion* Doing 1974 (2b)
- *Eu-Arction* Sissingh in Westhoff et al. 1946 (orig.form) (corresp.; as suballiance)

epi18 Sometimes this unit (under the name '*Eu-Arction* Tx. 1937 em. Sissingh 1946') is considered at the alliance level, which is a wrong perception/interpretation since it has been described by Sissingh (in Westhoff et al. 1946: 31) explicitly as as '*(Eu-) Arction* Sissingh *suball. nov.*', hence as a suballiance. (LM)

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EPI-03B *Balloto-Conion maculati* S. Brullo et Marcenò 1985

Tall-herb perennial ruderal vegetation in mesic habitats in the submontane and montane belts of submediterranean Europe

- *Sambucion ebuli* (O. de Bolòs et Vigo ex Rivas-Mart. et al. 1991) Rivas-Mart. et M. Costa 1998 (2b)
- *Conio maculati-Sambucion ebuli* (Rivas-Mart. et Costa 1998) Rivas-Mart. et al. 2001 (syntax.syn.)

EPI-04 *Galio-Alliarietalia* Oberd. in Görs et T. Müller 1969

Ruderal and semi-natural thermophilous fringe vegetation of short-lived herbs on nutrient-rich soils in the submontane and montane belts of submediterranean Europe

EPI-04A *Geo urbani-Alliarion officinalis* Lohmeyer et Oberd. in Görs et T. Müller 1969

Ruderal and semi-natural fringe thermophilous vegetation of short-lived low herbs on nutrient-rich soils of temperate Europe

- *Alliarion* Oberd. 1957 (phantom)
- *Alliarion petiolatae* Hejný in Holub et al. 1967 (2b)
- *Galio-Alliarion* Lohmeyer et Oberd. in Oberd. et al. 1967 (2b)
- *Geo urbani-Alliarion petiolatae* Lohmeyer et Oberd. in Görs et T. Müller 1969 *nom. mut. propos.* (45)

epi19 The formal mutation of the name *Geo urbani-Alliarion officinalis* to the *Geo urbani-Alliarion petiolatae* Lohmeyer et Oberd. in Görs et Müller 1969 was suggested by Láníková in Chytrý (2009: 334). (LM)

- *Geo urbani-Alliarion* Sissingh 1973 (31)
- *Lapsano communis-Geranion robertiani* (Sissingh 1973) Dierschke 1974 (29)
- *Alliarion* Oberd. ex Passarge 1978 (syntax.syn.)
- *Anthrisco-Chaerophyllion* (Tx. et Brun-Hool 1975) Gehlken 2003 (2b, 5)

EPI-04B *Anthriscion nemorosae* S. Brullo in S. Brullo et Marcenò 1985

Ruderal and semi-natural thermophilous fringe vegetation of short-lived herbs on nutrient-rich soils in the submontane and montane belts of submediterranean Europe

- *Parietario judaicae-Arion italici* Biondi, Casavecchia et Gasparri in Biondi et al. 2014 (syntax.syn.)

EPI-05 *Convolvuletalia sepium* Tx. ex Moor 1958

Semi-natural fringe vegetation on banks of rivers and other water bodies of temperate Europe and the Mediterranean

- *Convolvuletalia sepium* Tx. 1950 (2b)
- *Calystegietalia sepium* Tx. ex Moor 1958 *nom. mut. propos.* (45)

epi20 The proposal to mutate this name was presented and argued in detail by Dengler et al. (2004: 367). (LM)

- *Filipendulo-Calystegietalia sepium* Doing 1963 (2b)
- *Galio-Convolvuletalia* (Tx. 1950) Oberd. et al. 1967 (2b)
- *Calystegietalia sepium* Tx. 1950 *corr*. Julve 1993 (2b, *corr.superfl.*)
- *Convolvuletalia sepium* Tx. ex Mucina 1993 (31)
- *Calystegietalia sepium* Tx. ex Mucina 1993 *nom. mut. propos.* (45)

epi21 Rivas-Martínez et al. (2002a: 252) formally suggested this name change. Nomenclature Commission (Willner et al. 2011) handled this case, yet without reaching a decision. (LM)

- *Convolvuletalia sepium* Tx. em. Mucina 1993 (orig.form) (*sensu* Rivas-Mart. et al. 2011) (phantom)

epi22 Unlike Rivas-Martínez et al. (2011: 253) we maintain that there is no '*Convolvuletalia sepium* Tx. em. Mucina 1993' in Mucina (1993b). (LM)

GROUP OF TEMPERATE ALLIANCES

EPI-05A *Senecionion fluviatilis* Tx. ex Moor 1958

Tall-herb fringe vegetation on nutrient-rich river banks and in ditches of Central Europe

- *Convolvulion sepium* Oberd. 1949 (2b)
- *Convolvulion sepium* Tx. 1947 (2b)
- *Senecionion fluviatilis* Tx. 1947 (phantom)
- *Senecionion fluviatilis* Tx. 1950 (2b)
- *Senecionion fluviatilis* Tx. ex Oberd. 1950 (2b)
- *Convolvulion sepium* Tx. ex Oberd. 1957 (2b)
- *Calystegion sepium* Tx. ex Oberd. 1957 (phantom)
- *Calystegion sepium* Tx. 1947 (in Julve 1993) (2b, *mut. superfl.*)

epi23 Rivas-Martínez et al. (2002a: 252) formally suggested this name change. It appears, however, that the name proposed for the mutation was invalidly published, and therefore this attempt to introduce a *nomen mutatum* is deemed superfluous. (LM)

- *Soncho-Euphorbion palustris* Westhoff et Den Held 1969
- *Calystegio sepium-Althaeion officinalis* de Foucault 2011

EPI-05B *Archangelicion litoralis* Scamoni et Passarge 1963

Tall-herb fringe vegetation on river banks of Central and Eastern Europe

- *Convolvulo-Archangelicion litoralis* Tx. 1950 (2b)
- *Angelicion littoralis* Tx. 1959 (*sensu* Géhu & Géhu-Franck 1984) (phantom)
- *Angelicion littoralis* Lohmeyer et al. 1962 (2b)
- *Humulo-Polygonion dumetorum* Passarge 1965 (2b)
- *Humulo-Fallopion dumetorum* Passarge 1975
- *Symphyto officinalis-Filipendulion ulmariae* Klauck 1993
- *Galio veri-Aristolochion clematidis* Shevchyk et V. Solomakha in Shevchyk et al. 1996
- *Epilobion hirsuti* Van't Veer, Schaminée et Weeda in Stortelder et al. 1999 (5)

EPI-05C *Nardosmion laevigatae* Klotz et Köck 1986

Tall-herb fringe vegetation on nutrient-rich river banks of mountain rivers and streams of the Southern Urals

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GROUP OF MACARONESIAN-MEDITERRANEAN ALLIANCES

EPI-05D *Cynancho-Convolvulion sepium* Rivas Goday et Rivas-Mart. ex Rivas-Mart. 1977

Western Mediterranean tall-herb vegetation in nutrient-rich riparian habitats

- *Cynancho-Convolvulion sepium* Rivas Goday et Rivas-Mart. 1963 (3b)
- *Cynancho-Calystegion sepium* Rivas Goday et Rivas-Mart. ex Rivas-Mart. 1977 *nom. mut. propos.* (45)
- *Bromo ramosi-Eupatorion cannabini* O. de Bolòs et Masalles in O. de Bolòs 1983 (syntax.syn.)
- *Cynancho acuti-Calystegion sepium* Rivas Goday et Rivas-Mart. ex de Foucault 2011 (31)

EPI-05E *Dorycnio recti-Rumicion conglomerati* Gradstein et Smittenberg 1977

Central and Eastern Mediterranean tall-herb vegetation in nutrient-rich riparian habitats

- *Dorycnion recti* Géhu et Biondi 1989 (syntax.syn.)

EPI-05F *Ipomoeo acuminatae-Ageratinion adenophorae* Espírito-Santo et al. 2004

Canarian-Madeirean tall-herb riparian vegetation rich in neophytes

- *Ageratinio adenophorae-Ipomoeion acuminatae* Espírito-Santo et al. 2004 *nom. invers. propos.* (42)

epi24 The proposal to invert the name was published by Costa et al. (2005). (LM)

ARC *Matricario-Poetea arcticae* A. Ishbirdin in Sumina 2012

Anthropogenic vegetation in human-disturbed habitats in the subarctic and Arctic zones of Russia, Siberia and North America

- *Chamerio-Betuletea nanae* Khusainov et A. Ishbirdin in Khusainov et al. 1989 (1)
- *Matricario-Poetea arcticae* A. Ishbirdin, Khusainov et Mirkin 1999 (2b, 5)
- *Matricario-Poetea arcticae* A. Ishbirdin 2001 (1)
- *Chamerio-Betuletea nanae* Khusainov et A. Ishbirdin in Sumina et Mironova 2004 (2b, 8)
- *Chamerio-Betuletea nanae* Khusainov et A. Ishbirdin in Sumina 2011 (2b, 8)
- *Matricario-Poetea arcticae* A. Ishbirdin in Sumina 2011 (1)
- *Matricario-Poetea arcticae* A. Ishbirdin in Sumina 2013 (2b, 8)

ARC-01 *Chamerio-Betuletalia nanae* Khusainov et al. in Sumina 2012

Anthropogenic vegetation in human-disturbed habitats in the subarctic and Arctic zones of Russia, Siberia and North America

- *Chamerio-Betuletalia nanae* Khusainov et A. Ishbirdin in Khusainov et al. 1989 (1)
- *Chamerio-Betuletalia nanae* A. Ishbirdin 2001 (1)
- *Chamerio-Betuletalia nanae* Khusainov et A. Ishbirdin in Sumina et Mironova 2004 (5)
- *Matricario-Poetalia alpigenae* A. Ishbirdin 1991 (*sensu* Sumina & Mironova 2004) (phantom)
- *Matricario-Poetalia alpigenae* Pestryakov et Okhlopkov 2013 (2b, 5, 8)

ARC-01A *Chamerio angustifolii-Matricarion hookeri* A. Ishbirdin et al. 1996

Anthropogenic vegetation on disturbed soils characterized by cryoturbation and solifluction of Arctic Northern Russia

- *Epilobio angustifolii-Tripleurospermion hookeri* A. Ishbirdin et al. 1996 *nom. mut. propos.* (45)
- *Chamerio-Betulion nanae* Khusainov et al. 1989 (1)
- *Matricario-Poion alpigenae* Cherosov 1991 (2b, 5)
- *Poo alpigenae-Descurainion sophioidis* Pestryakov et al. 1992 (2b, 5)
- *Matricario-Poion alpigenae* Czerosov in Pestryakov et Okhlopkov 2013 (2b, 5, 8)

BID *Bidentetea* Tx. et al. ex von Rochow 1951

Summer-annual pioneer vegetation of seasonally flooded nutrient-rich river alluvia, lacustrine banks and heavily nutrient-loaded anthropogenic habitats of boreo-temperate Europe and North Africa

- *Bidentetea tripartitae* Tx. et al. in Tx. 1950 (2b)
- *Rudereto-Manihotetea utilissimae sensu* O. de Bolòs 1988, *non Rudereto-Manihotetea pantropicalia* Léonard in Taton 1949 (pseudonym)

BID-01 *Bidentetalia* Br.-Bl. et Tx. ex Klika et Hadač 1944

Summer-annual pioneer vegetation of seasonally flooded nutrient-rich river alluvia, lacustrine banks and heavily nutrient-loaded anthropogenic habitats of boreo-temperate Europe

- *Bidentetalia tripartitae* Br.-Bl. et Tx. 1943 (2b)
- *Chenopodietalia rubri* Felzines et Loiseau 2006 (syntax. syn.)

BID-01A *Bidention tripartitae* Nordhagen ex Klika et Hadač 1944

Summer-annual pioneer vegetation of periodically nutrient-rich river banks and drained muddy bottoms of eutrophic lakes of boreo-temperate Europe

- *Polygono-Chenopodion polyspermi* Koch 1926 *nom. ambig. rejic. propos.* (3f, 36)

bid01 Formal suggestions to consider this name as *nomen ambiguum* were published by Kießlich et al. (2003) and by Šumberová & Lososová (in Chytrý 2011: 349). (LM) The name *Polygono-Chenopodion polyspermi* Koch 1926 being invalidly published (ICPN art. 3f) this proposal is superfluous. (JPT)

- *Polygono-Chenopodion polyspermi* Br.-Bl. 1931 (2b)
- *Bidention tripartitae* Nordhagen 1940 (3d)

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bid02 In case the *Polygono-Chenopodion polyspermi* (Koch 1926) is rejected as *nomen ambiguum* (see Remark *bid01*), then the *Bidention tripartitae* should be considered the valid name of this syntaxon. (MC, LM)

- *Alopecurion aequalis* Eber 1975

BID-01B *Chenopodion rubri* (Tx. in Poli et J. Tx. 1960) Hilbig et Jage 1972

Summer-annual pioneer vegetation in heavily nutrient-loaded and saline ruderal habitats of temperate Europe

- *Chenopodion fluviatile* Tx. in Poli et J. Tx. 1960 (34a)
- *Chenopodion rubri* Oberd. et al. 1967 (2b)
- *Chenopodion rubri* Soó 1968 (2b)
- *Chenopodion rubri* Soó 1969 (2b)
- *Chenopodion rubri* (Tx. in Poli et J. Tx. 1960) Kopecký 1969 (phantom)
- *Chenopodion rubri* (Tx. in Poli et J. Tx. 1960) Dobrescu et Kovács 1972 (31)
- *Chenopodion glauci* Hejný 1974 (syntax.syn.)
- *Chenopodion rubro-polyspermi* Passarge 1978 (2b)
- *Xanthion italici* Felzines et Loiseau 2006 (syntax.syn.)

BID-02 *Paspalo-Heleochloetalia* Br.-Bl. ex Rivas Goday 1956

Summer-annual pioneer vegetation of periodically flooded subsaline nutrient-rich river alluvia of the mediterranean regions of Europe and North Africa

- *Paspalo-Heleochloetalia* Br.-Bl. in Br.-Bl. et al. 1952 (3f)
- *Crypsio-Paspaletalia* Br.-Bl. in Br.-Bl. et al. 1952 *nom. mut. propos. et nom. invers. propos.* (42, 45)
- *Bidentetalia pilosae sensu* de Bolòs 1988, *non Bidentetalia pilosae* Lebrun in Mullenders 1949 (pseudonym)
- *Paspalo distichi-Polypogonetalia semiverticillatae* Delpech et Géhu in Bardat et al. 2004 (syntax.syn.)

BID-02A *Paspalo-Agrostion semiverticillati* Br.-Bl. in Br.-Bl. et al. 1952

Summer-annual pioneer vegetation of periodically flooded subsaline nutrient-rich river alluvia of the mediterranean regions of Europe and North Africa

- *Paspalo-Polypogonion semiverticillati* Br.-Bl. in Br.-Bl. et al. 1952 *nom. mut. propos.* (45)
- *Paspalo-Polypogonion viridis* Br.-Bl. in Br.-Bl. et al. 1952 *nom. mut. propos.* (45)

bid03 Rivas-Martínez et al. (2002a: 271) formally suggested this name change. (LM)

- *Paspalo-Bidention* Rivas Goday 1964 (3b)
- *Ecliption prostratae sensu* de Bolòs 1988, *non Ecliption albae* Lebrun 1947 (pseudonym)

ORY *Oryzetea sativae* Miyawaki 1960

Weed vegetation of the rice fields of Eurasia

ORY-01 *Cypero difformis-Echinochloetalia oryzoidis* O. de Bolòs et Masclans 1955

Weed vegetation of the rice fields of Eurasia

- *Oryzo-Echinochloetalia* O. de Bolòs et Masclans 1955 (*sensu* Borhidi et al. 1999) (phantom)

ORY-01A *Oryzo sativae-Echinochloion oryzoidis* O. de Bolòs et Masclans 1955

Weed vegetation of the rice fields of the warm-temperate and cool-temperate Europe

- *Oryzion sativae* Koch 1954 (3b)

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Appendix 2

EuroVegChecklist 2 (EVC2): Conspectus of the high-rank syntaxa of the European vegetation dominated by bryophytes and lichens

For the abbreviations and citing conventions see the header of the Appendix 1.

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EPIGAEIC BRYOPHYTE AND LICHEN VEGETATION

FUN *Funarietea hygrometricae* von Hübschmann 1957

Hemerophilous bryophyte vegetation on burned sites, bones and animal droppings

fun01 Marstaller (2006) distinguished the *Splachnetea lutei* as a class in its own right and placed the *Funarietalia hygrometricae* in the *Psoretea decipientis*. (HB)

- *Splachnetea lutei* von Hübschmann 1957 (syntax.syn.)

FUN-01 *Splachnetalia lutei* Hadač et Klika ex von Hübschmann 1957

Hemerophilous bryophyte vegetation on bones and animal droppings of the alpine and arctic regions

- *Splachnetalia* Hadač in Klika et Hadač 1944 (2b)
- *Splachnetalia* Hadač ex Klika 1948 (2b)

FUN-01A *Splachnion lutei* Hadač et Klika ex von Hübschmann 1957

Hemerophilous bryophyte vegetation on bones and animal droppings of the alpine and arctic regions

fun02 Splachnum luteum is included in the original diagnosis of von Hübschmann (1957) by citing the *Splachnetum* of von Krusenstjerna (1945), which is described with an equivalent of a simple table in the text containing the name-giving taxon *Splachnum luteum*. (HB)

- *Splachnion lutei* Hadač in Klika et Hadač 1944 (2b)
- *Splachnion* von Krusenstjerna 1945 (2b)
- *Splachnion lutei* Hadač ex Klika 1948 (2b)

FUN-02 *Funarietalia hygrometricae* von Hübschmann 1957

Hemerophilous bryophyte vegetation on the soil surface of burned sites and fire places

FUN-02A *Funarion hygrometricae* von Hübschmann 1957

Hemerophilous bryophyte vegetation on the soil surface of burned sites and fire places

- *Funarion hygrometricae* Hadač in Klika 1948 (2b)
- *Funarion hygrometricae* Engel 1949 (phantom)

CER *Ceratodonto purpurei-Polytrichetea piliferi* Mohan 1978

Bryophyte and lichen vegetation on dry acid to subneutral, silty-sandy and gravelly soils

- *Chthonoblastetea* Mattick 1951 (orig.form) (2b)
- *Cladino-Cetrarietea* Mattick 1951 (2b)
- *Peltigeretea caninae* Schubert et Stordeur 2011 (2b, 5)

CER-01 *Polytrichetalia piliferi* von Hübschmann 1975

Bryophyte vegetation on dry, acid to subneutral, silty-sandy and gravelly soils

CER-01A *Polytrichion piliferi* Šmarda 1947

Bryophyte vegetation on dry acid sandy dunes in the nemoral and boreal zones

cer01 Because the only association *(Polytrichetum piliferi)* of the alliance is an illegitimate homonym Marstaller (1993) rejected erroneously the name *Polytrichion piliferi* Šmarda 1947 also as an illegitimate name (ICPN art. 17). On the other hand, although Šmarda (1947) ranked his units as 'sociations' he nevertheless considered them at the same time as associations, as it is explicitly indicated in the

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English summary (p. 87). Therefore, the name *Polytrichion piliferi* Šmarda 1947 is validly published. (HB)
- *Ceratodonto-Polytrichion piliferi* Waldheim 1947 (corresp.; as suballiance)
- *Rhacomitrion canescentis* Šmarda 1947 (syntax.syn.)
- *Ceratodonto-Polytrichion piliferi* Waldheim ex von Hübschmann 1967 (syntax.syn.)

CER-01B *Campylopodion polytrichoidis* Giacomini 1951

Bryophyte vegetation on dry, acid to subneutral, silty-sandy and gravelly soils of (sub)mediterranean distribution
- *Campylopodion fragili-introflexi* Guerra et al. 1981 (syntax.syn.)

CER-02 *Peltigeretalia* Klement 1949

Lichen vegetation on dry, acid to subneutral, silty-sandy and gravelly soils
- *Peltigeretalia* Klement 1950 (31)
- *Chthonoblastetalia* Mattick 1951 (orig.form) (2b)
- *Cladino-Cetrarietalia* Mattick 1951 (2b)
- *Ochrolechietalia* Mattick 1951 (2b)

CER-02A *Baeomycetion rufi* Klement 1952

Pioneer lichen crust on dry, acid to subneutral, silty-sandy soils

cer02 The form '*Baeomycion*' is established for alliances named after *Baeomyces* species, but it has to be corrected to *Baeomycetion* (Weber et al. 2000). (HB)
- *Baeomycion rosei* Hadač in Klika 1948 (orig.form) (2b)
- *Biatorion uliginosae* Mattick 1951 (2b)
- *Chthonoblastion* Mattick 1951 (orig.form) (2b)
- *Baeomycion rufis* Klement 1952 (orig.form)
- *Baeomycion roseis* Klement 1955 (orig.form) (syntax.syn.)
- *Dibaeidion baeomycetis* Klement 1955 *nom. mut. propos.* (45)

CER-02B *Cladonion arbusculae* Klement 1949 *corr.* Bültmann *hoc loco*

Macrolichen vegetation on nutrient-poor, dry, acid to subneutral, silty-sandy and gravelly soils

cer03 Ahti (1961) and Santesson (1966) showed that the name *Cladonia sylvatica* (L.) Hoffm. was wrongly employed in the identification literature for the species *Cladonia arbuscula* (Wallr.) Flot. The name *Cladonia sylvatica (L.) Hoffm.* cannot be interpreted as different from *C. rangiferina* (L.) G.H. Web., and it is now ruled as suppressed (International Code of Botanical Nomenclature art. 56, Appendix VI). Thus the name *Cladonion sylvaticae* has to be corrected to *Cladonion arbusculae* (ICPN art. 43): *Cladonion arbusculae* Klement 1949 *corr*. Bültmann *nom. corr. hoc loco* (original name: *Cladonion silvaticae* Klement 1949: 12), *lectotypus hoc loco*: *Cladonietum mitis* Klement 1947 (Klement 1947: 296–297). (HB)
- *Cladonion silvaticae* Klement 1949 (orig.form) (43)

cer04 Klement in his earlier publications (before Klement 1958) used the epithet form '*silvaticae*', which has to be corrected to '*sylvaticae*'. (HB)
- *Cladonion arbusculae* Klement 1950 *corr*. Wirth 1980 (31, *corr.superfl.*)

cer05 Wirth (1980: 32) proposed a mutation of the name *Cladonion sylvaticae* Klement 1950 to *Cladonion arbusculae* Klement 1950. However, as Otte (2008: 374) argued, it is not a mutation, but a correction (ICPN art. 43; see Remark *cer03*). (HB)
- *Cladonion silvaticae* Klement 1950 (orig.form) (31)
- *Cladinion silvaticae* Mattick 1951 (orig.form) (2b)
- *Cornicularion aculeatae* Mattick 1951 (2b)
- *Cladonion silvestris* Klement 1952 (orig.form) (31)

cer06 Since there is no species *Cladonia silvestris*, we presume that Klement (1952: 70) erroneously coined the name as '*Cladonion silvestris*' having '*Cladonion sylvaticae*' in mind. (HB)
- *Cladonion sylvaticae* Klement 1959 (31)
- *Cladonion rangiformis* Krause et Klement 1962 (syntax.syn.)
- *Cladonion rangiformis* Klement 1965 (31)
- *Cladonion* Hawksworth 1972 (syntax.syn.)

CER-02C *Cladonion rei* Paus 1997

Macrolichen vegetation on slightly nutrient enriched, dry, acid to subneutral, silty-sandy and gravelly soils

CER-02D *Cetrarion nivalis* Klement 1955

Chionophobous lichen vegetation on acid soil surfaces and on humus over calcareous soils of arctic-alpine distribution
- *Alectorion ochroleucae* Mattick 1951 (2b)
- *Cetrarion* Mattick 1951 p.p. (2b)

CER-02E *Solorinion croceae* Klement 1955

Chionophilous lichen vegetation of arctic-alpine distribution

CER-02F *Lecanorion verrucosae* Kalb 1970

Lichen crusts on plant debris and on bryophyte mats over calcareous substrates in the arctic zone and the alpine belt
- *Aspicilion verrucosae* Kalb 1970 *nom. mut. propos.* (45)
- *Megasporion verrucosae* Kalb 1970 *nom. mut. propos.* (45)

CER-02G *Ochrolechion tartareae* Klement 1955

Lichen crusts on plant debris and on bryophyte mats over non-calcareous substrates in the arctic zone and the alpine belt
- *Ochrolechion polare* Mattick 1951 p.p. (2b)

PSO *Psoretea decipientis* Mattick ex Follmann 1974

Bryophyte and lichen vegetation on subneutral and calcareous soils
- *Psoretea decipientis* Mattick 1951 (2b)
- *Barbuletea unguiculatae* von Hübschmann 1967 (phantom)
- *Psoretea decipientis* Mattick ex Crespo et Barreno 1975 (31)
- *Barbuletea unguiculatae* Mohan 1978 (syntax.syn.)
- *Barbuletea unguiculatae* von Hübschmann 1986 (31)

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PSO-01 *Barbuletalia unguiculatae* von Hübschmann 1960

Meso-hemerophilous and euhemerophilous pioneer bryophyte vegetation on denuded temporary dry and very dry loamy soils

- *Phasco cuspidati-Riccietalia glaucae* Rivola 1987 (2b)
- *Tortulo brevissimae-Aloinetalia bifrontis* Ros et Guerra 1987 (5)

PSO-01A *Phascion* Waldheim 1944 *nom. inval. ad interim*

Euhemerophilous pioneer bryophyte vegetation on temporary dry and dry loamy soils in the nemoral and boreal zones

pso01 Waldheim (1944: 41) described the alliance '*Phascion*' with the subordinate associations '*Pottietum lanceolatae*', '*Pottietum truncatae*' and '*Aloinetum*'. All the relevés of the alliance, made of presence-absence data, are gathered in a single table without the specification which of the relevés belong to which association. Below the association level, Waldheim distinguished sociations that can be related to the relevés, at least partially. According to ICPN art. 7, Waldheim's associations are invalidly published because no quantitative information is given for the relevés. However, this may change with ICPN ed. 4 as a table of relevés with presence-absence data is not different from a synoptic relevé. Therefore, names like *Phascion* Waldheim 1944 are invalidly published only *ad interim*. Choosing the *Pottietum truncatae* Waldheim 1944 as a lectotype of the alliance when the name of this association will be validly published will make the *Phascion* Waldheim 1944 a homotypic synonym of the name *Phascion cuspidatae* Waldheim ex von Krusenstjerna 1945 that is presently the validly published name (ICPN art. 7). (HB, JPT)

- *Phascion* Waldheim ex von Krusenstjerna 1945 (syntax.syn.)

pso02 Marstaller (2006) classified this alliance in the *Funarietalia hygrometricae*. (HB)

- *Phascion cuspidati* Waldheim ex von Krusenstjerna 1945 (Rec.10C, 30)

pso03 Marstaller (2006) introduced the name *Phascion cuspidati* Waldheim ex von Krusenstjerna 1945, however though *Phascum cuspidatum* is the most frequent species, there are two species of *Phascum* in the original diagnosis by von Krusenstjerna (1945: 122) and therefore the adoption of the epithet '*cuspidati*' is not admissible. (HB)

- *Phascion* Waldheim 1947 (syntax.syn.)
- *Phascion cuspidatae* Waldheim 1947 (orig.form) (corresp.; as suballiance)
- *Phascion cuspidati* Waldheim ex von Hübschmann 1960 (syntax.syn.)
- *Phascion cuspidati* Waldheim ex Rivola 1987 (2b)
- *Cheilothelion chloropi* Jiménez et al. 2002 (2b)

pso04 Jiménez et al. (2002) described the alliance with one invalid association, invalid because he did not use the Latin word *typus* as is required by the ICPN art. 5. Marstaller (2006) considered the alliance as valid yet problematic and transferred it to the *Funarietalia* from the *Dicranelletalia heteromallae*, where Jiménez et al. (2002) had placed it before. (HB)

PSO-01B *Grimaldion fragrantis* Šmarda et Hadač in Hadač et Šmarda 1944

Pioneer bryophyte vegetation on dry loamy soil in grasslands in the nemoral zone and the Mediterranean

- *Grimaldion fragrantis* Šmarda 1947 (31)
- *Phascion mitriformis* Waldheim 1947 (corresp.; as suballiance)
- *Tortellion inclinatae* Šmarda 1947 (syntax.syn.)
- *Aloinion* von Hübschmann 1960 (2b)
- *Phascion mitraeforme* von Hübschmann 1960 (orig.form) (2b)
- *Pleurochaetion squarrosae* Neumayr 1971 (syntax.syn.)
- *Phascion curvicollis* Rivola 1987 (syntax.syn.)

PSO-01C *Mannion androgynae* Ros et Guerra 1987

Pioneer bryophyte vegetation on subneutral dry soils in Mediterranean garrigues

PSO-01D *Cephaloziello baumgartneri-Southbyion nigrellae* Guerra et Gil 1982

Pioneer bryophyte vegetation on calcareous soils in crevices in sheltered habitats

PSO-01E *Tortellion flavovirentis* Guerra ex Guerra et Puche 1984

Pioneer bryophyte vegetation on subneutral and dry soils under the influence of sea-borne salt spray

- *Tortellion flavovirentis* Guerra 1982 (3b)

PSO-01F *Aloino bifrontis-Crossidion crassinervis* Ros et Guerra ex Marstaller 2006

Pioneer bryophyte vegetation on dry exposed soil surfaces in arid Mediterranean grasslands and pseudosteppes

- *Aloino-Crossidion crassinervis* Ros et Guerra 1987 (5)
- *Pottio-Riccion crustatae* Ros et Guerra 1987 (3g, 5)
- *Pottio commutatae-Riccion crustatae* Ros et Guerra ex Marstaller 2006 (syntax.syn.)

PSO-02 *Toninietalia coeruleonigricantis* Hadač 1962

Lichen vegetation on subneutral to highly basic soils

- *Toninietalia coeruleonigricantis* Hadač in Klika 1948 (3b)
- *Psoretalia decipientis* Mattick 1951 (2b)
- *Psoretalia decipientis* Mattick ex Follmann 1974 (syntax.syn.)

PSO-02A *Toninion coeruleonigricantis* Hadač in Klika 1948

Lichen vegetation on moderately dry, subneutral to highly basic soils

- *Toninion sedifoliae* Hadač in Klika 1948 *nom. mut. propos.* (45)
- *Toninion coeruleonigricantis* Reimers 1950 (phantom)
- *Cladonion convolutae* Mattick 1951 (2b)
- *Psorion decipientis* Mattick 1951 (2b)

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• *Toninion coeruleonigricantis* Reimers 1951 (31)

PSO-02B *Sphaerothallio-Xanthoparmelion vagantis* Crespo et Barreno 1978

Lichen vegetation on dry, subneutral to highly basic soils in the semiarid and arid regions of Southern and Eastern Europe

• *Aspicilion esculentae* Mattick 1951 (2b)
• *Diploschistion* Mattick 1951 (2b)
• *Parmelion hypoclystae* Mattick 1951 (2b)
• *Diploschistion terrestris* Klement 1955 (34a)
• *Diploschistion bryophilis* Klement 1958 (2b)
• *Diploschistion scruposi* Follmann 1976 (2b)

PSO-03 *Fulgensietalia desertori* Crespo et Barreno 1975

Strongly xerophilous lichen vegetation on subneutral to highly basic soils or in rock fissures of Southern Europe

PSO-03A *Psorion savicii* Crespo et Barreno 1975

Strongly xerophilous lichen vegetation on subneutral to highly basic soils

PSO-03B *Protoblastenion testaceae* Barreno 1979

Chomophytic communities of squamulose psorid lichens in narrow fissures on calcareous or other base-rich rocks

pso05 Barreno (1979) classified the chomophytic alliance *Protoblastenion testaceae* preliminary in the *Fulgensietalia desertori,* while Roux et al. (2009) considered it as a case of *incertae sedis as far as* its position in a class or in an order is concerned. (HB)

• *Psorion testaceae* Barreno 1979 *nom. mut. propos.* (45)

HYL *Hylocomietea splendentis* Gillet ex Marstaller 1992

Wefts of large competitive bryophytes on soils in the final stages of bryophyte succession

• *Hylocomietea splendentis* Gillet 1986 (1)
• *Pleurochaeto squarrosae-Abietinelletea abietinae* Marstaller 2002 (syntax.syn.)

HYL-01 *Hylocomietalia splendentis* Gillet ex Vadam 1990

Communities of large weft-forming competitive bryophytes on soils in the final stages of bryophyte succession

• *Hylocomietalia* Gillet 1986 (1)
• *Hylocomietalia* Gillet ex Marstaller 1993 (31)
• *Calliergonello cuspidatae-Rhytidiadelphetalia squarrosi* Bardat et Hauguel 2002 (2b)
• *Eurhynchietalia striati* Bardat et Hagel 2002 (3b)
• *Pleurochaeto squarrosae-Abietinelletalia abietinae* Marstaller 2002 (syntax.syn.)

HYL-01A *Rhytidion rugosi* Ştefureac 1941

Communities of large weft-forming pleurocarpous bryophytes on calcareous soils on dry, exposed rocks in grasslands and open forests

• *Camptothecion lutescentis* von Krusenstjerna 1945 (syntax.syn.)
• *Abietinellion abietini* Giacomini 1951 (syntax.syn.)
• *Abietinellion abietini* Giacomini ex Neumayr 1971 (31)
• *Homalothecio aurei-Pleurochaetion squarrosae* Marstaller 1993 (syntax.syn.)

HYL-01B *Pleurozion schreberi* von Krusenstjerna 1945

Communities of large weft-forming pleurocarpous bryophytes on nutrient-poor and acid raw humus in grasslands, heath and forests

• *Hylocomion splendentis* Vadam 1983 (syntax.syn.)
• *Sanionio uncinati-Pleurozion schreberi* Solomeshch in Baisheva et al. 1994 (syntax.syn.)

hyl01 This alliance was classified in the order *Dicranetalia scoparii* by Baisheva et al. (1994), while Marstaller (2006) placed this alliance in the *Hylocomietalia* (as a synonym of the *Pleurozion schreberi)*. (HB)

HYL-01C *Rhytidiadelphion squarrosi* von Krusenstjerna 1945

Communities of large weft-forming hemerophilous pleurocarpous bryophytes on nutrient-rich soils

• *Squarrosion* von Krusenstjerna 1945 (orig.form)

HYL-01D *Eurhynchion striati* Waldheim 1944

Communities of large weft-forming pleurocarpous bryophytes on nutrient-rich moist soils in shaded forest habitats

• *Eurhynchion* von Krusenstjerna 1945 (syntax.syn.)

HYL-01E *Climacion dendroidis* Ştefureac 1941

Communities of large weft-forming bryophytes on moist and wet organic soils

• *Mnio-Climacion* von Krusenstjerna 1945 (syntax.syn.)

HYL-01F *Fissidention taxifolii* Marstaller 2006

Communities of competitive pleurocarpous bryophytes on moderately basic to moderately acidic loamy soils in grasslands and forests

hyl02 Marstaller (2012) was doubtful about the position of this alliance. (HB)

CAM *Campylopodetea vaporarii* S. Brullo et al. 2004

Bryophyte vegetation of the Mediterranean fumaroles

CAM-01 *Campylopodetalia vaporarii* S. Brullo et al. 2004

Bryophyte vegetation of the Mediterranean fumaroles

CAM-01A *Campylopodion vaporarii* S. Brullo et al. 2004

Bryophyte vegetation of the Mediterranean fumaroles

EPILITHIC BRYOPHYTE AND LICHEN VEGETATION

PLA *Platyhypnidio-Fontinalietea antipyreticae* Philippi 1956

Bryophyte vegetation with occasional lichens in running water courses and cascades growing submerged in water and splash zones

• *Brachythecietea plumosi* von Hübschmann 1957 (syntax.syn.)

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- *Fontinalietea antipyreticae* von Hübschmann 1957 (syntax.syn.)
- *Hygrohypnetea* von Hübschmann 1957 (2b)

PLA-01 *Hygrohypnetalia* Krajina 1933

Bryophyte vegetation with occasional lichens in oligotrophic, clear, cool and acidic running waters and cascades in mountainous regions

pla01 Drehwald & Preising (1991) typified the name *Hygrohypnetalia* Krajina 1933 with the *Hygrohypnion dilatati* Krajina ex Plămăda 1974. This choice is illegitimate as the original diagnosis of the order contains the two alliances *Hygrohypnion dilatati* and *Andreaeion nivalis* (ICPN art. 19). Marstaller (2006) choose the former alliance and this choice must be followed. (HB)

- *Brachythecietalia plumosi* Philippi 1956 (syntax.syn.)
- *Hygrohypnetalia* Krajina ex Plămăda 1974 (31)

PLA-01A *Racomitrion acicularis* von Krustenstjerna 1945 *nom. inval. ad interim*

Temporarily inundated bryophyte vegetation with occasional lichens in oligotrophic, clear, cool and acidic running waters and cascades in mountainous regions

pla02 The alliance is described with the two associations *Scapanietum undulatae* and *Brachythecietum plumosi*, for which more than three relevés with presence-absence data are given in von Krusenstjerna (1945). A retroactive change of the upcoming new version of the ICPN will allow that as a sufficient diagnosis. (HB)

- *Acicularion* Waldheim 1944 (orig.form) (2b)
- *Acicularion* von Krustenstjerna 1945 (orig.form)
- *Lejeunion cavifoliae* Philippi 1956 p.p. (syntax.syn.)
- *Scapanion undulatae* Philippi 1956 (syntax.syn.)
- *Marsupello-Scapanion* Geissler 1976 (syntax.syn.)
- *Brachythecion plumosi* Drehwald 1991 (syntax.syn.)

PLA-01B *Hygrohypnion dilatati* Krajina 1933

Inundated bryophyte vegetation in oligotrophic, clear, cool and acidic streams in mountainous regions

- *Hygrohypnion dilatati* Krajina ex Plămăda 1974 (syntax.syn.)
- *Dermatocarpion rivulorum* Geisler 1976 (syntax.syn.)

PLA-02 *Leptodictyetalia riparii* Philippi 1956

Bryophyte vegetation in mesotrophic and eutrophic waters of rivulets and rivers at low altitudes

- *Platyhypnidietalia rusciformis* Philippi 1956 (syntax.syn.)
- *Fontinalietalia antipyreticae* von Hübschmann 1957 (syntax.syn.)
- *Brachythecietalia plumoso-rivularis* Drehwald 1991 (syntax.syn.)

PLA-02A *Platyhypnidion rusciformis* Philippi 1956 *nom. conserv. propos.*

Amphibious bryophyte vegetation in eutrophic waters of rivulets and rivers at low altitudes

pla03 The retroactive change to be introduced in the upcoming new version of the ICPN will have the consequence, that the *Rhynchostegion riparioidis* von Krusenstjerna 1945 will become validly published and would hence replace the younger name *Platyhypnidion rusciformis* Philippi 1956. However, we intend to propose the conservation of the well-established and accepted name *Platyhypnidion rusciformis* Philippi 1956 against the *Rhynchostegion riparioidis* von Krusenstjerna 1945, that, according to the ICPN 3, had been considered as invalid and therefore has not been applied in the past. (HB)

- *Rhynchostegion riparioidis* Waldheim 1944 (2b)
- *Rhynchostegion riparioidis* von Krusenstjerna 1945 *nom. inval. ad interim.*
- *Rhynchostegion riparioidis* Waldheim ex von Hübschmann 1957 (syntax.syn.)
- *Heterocladio-Jubulion* Sjögren 1995 (1)
- *Heterocladion hutchinsiae* Sjögren 1997 (2b)
- *Heterocladio-Jubulion* Sjögren 2003 p.p. (3i, 5)

PLA-02B *Brachythecion rivularis* Hertel 1974

Bryophyte vegetation in calcareous mesotrophic and eutrophic, fast flowing rivulets and rivers at low altitudes

PLA-02C *Fontinalion antipyreticae* W. Koch 1936

Submerged bryophyte vegetation in eutrophic waters of slowly flowing rivulets and rivers at low altitudes

- *Fissidention crassipedis* W. Koch 1936 (syntax.syn.)
- *Fissidention crassipedis* (W. Koch 1936) Philippi 1956 (orig.form) (corresp.; as suballiance)

PLA-02D *Cinclidotion fontinaloidis* Philippi 1956

Temporarily submerged bryophyte vegetation in eutrophic waters of fast flowing rivulets and rivers at low altitudes

- *Leptodictyion riparii* Philippi 1956 (syntax.syn.)
- *Cinclidoto-Fissidention crassipedis* von Hübschmann 1957 (syntax.syn.)

PLA-02E *Fissidention rivularis* Marstaller 1987

Hygrophyte bryophyte vegetation in shaded sites at rivulets and cascades in the Mediterranean region

- *Heterocladio-Jubulion* Sjögren 2003 p.p. (3i, 5)

ALA *Aspicilietea lacustris* Wirth 1972

Amphibious and permanently submerged lichen communities on rocks in clear, mainly mineral-poor water bodies

- *Hydroverrucarietea* Mattick 1951 (2b)
- *Hydroverrucarietea* Hadač 1962 (2b)
- *Hymenelietea lacustris* Wirth 1972 *nom. mut. propos.* (45)
- *Aspicilietea lacustris* Wirth ex Drehwald 1993 (31)

ALA-01 *Hydroverrucarietalia* Černohorský et Hadač ex Klement 1955

Amphibious and permanently submerged lichen communities on rocks in clear, mainly mineral-poor water bodies

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ala01 Lectotypus hoc loco: *Aspicilion lacustris* Klement 1955 (Klement 1955: 95–99). (HB)

- *Hydroverrucarietalia* Černohorský et Hadač in Klika et Hadač 1944 (2b)
- *Dermatocarpetalia rivulorum* Hadač in Klika 1948 (2b, 3f)

ala02 The *Dermatocarpion rivulorum* Hadač 1944 (the subordinate syntaxon of the *Dermatocarpetalia rivulorum* Hadač in Klika 1948) was erroneously and misleadingly printed at the end of the chapter featuring the order *Umbilicarietalia* in Klika (1948). (HB)

- *Hydroverrucarietalia* Černohorský et Hadač ex Klika 1948 (2b)
- *Dermatocarpetalia rivulorum* Mattick 1951 (2b)
- *Hydroverrucarietalia* Mattick 1951 (2b)
- *Hydroverrucarietalia* Černohorský et Hadač ex Wirth 1972 (31)
- *Aspicilietalia lacustris* Drehwald 1993 (syntax.syn.)

ALA-01A *Verrucarion siliceae* Wirth 1972

Permanently submerged lichen communities on rocks in clear, mineral-poor water bodies

- *Verrucarion funckii* Wirth 1972 *nom. mut. propos.* (45)

ALA-01B *Aspicilion lacustris* Klement 1950

Amphibious lichen communities on rocks in clear, mineral-poor water bodies

- *Dermatocarpion rivulorum* Hadač in Klika et Hadač 1944 (2b)
- *Rhizocarpion lavati* Hadač in Klika et Hadač 1944 (2b)
- *Verrucarion praetermissae* Černohorský et Hadač in Klika et Hadač 1944 (2b)
- *Dermatocarpion rivulorum* Hadač ex Klika 1948 (2b, 3f)
- *Rhizocarpion lavati* Hadač ex Klika 1948 (2b)
- *Verrucarion praetermissae* Černohorský et Hadač ex Klika 1948 (2b)
- *Dermatocarpion rivulorum* Mattick 1951 (2b)
- *Rhizocarpion lavati* Mattick 1951 (2b)
- *Verrucarion praetermissae* Mattick 1951 (2b)
- *Aspicilion lacustris* Klement 1955 (31)
- *Verrucarion praetermissae* Černohorský et Hadač ex Wirth 1972 (syntax.syn.)
- *Ephebion lanatae* von Brackel 1993 (3b)
- *Verrucarion elaeomelaenae* von Brackel 1993 (3b)

ala03 The provisional alliance *Verrucarion elaeomelaenae* includes aquatic lichen stands in calciferous water in lowland areas. This type of vegetation is little known and possible relationships to bryophyte vegetation should be studied. (HB)

ALA-01C *Staurothelion solventis* Roux in Bültmann et al. 2015

Submerged lichen communities on calcareous rocks in the montane and subalpine belts

ALA-01D *Porinion lectissimae* Wirth 1980

Sciophilous lichen communities on damp acidic rocks wetted by temporary water streams or trickles

VMA *Verrucarietea maurae* Drehwald 1993

Coastal rock lichen communities of the eulittoral to mid-supralittoral zones

- *Physcietea* Mattick 1951 p.p. (2b)
- *Lichinetea confinis* Wirth 1972 (2b)

VMA-01 *Verrucarietalia maurae* Drehwald 1993

Coastal rock lichen communities of the eulittoral to mid-supralittoral zones

- *Physcietalia caesiae* Mattick 1951 p.p. (2b)

VMA-01A *Caloplacion marinae* Klement 1955

Coastal rock lichen communities of the eulittoral to mid-supralittoral zones

- *Verrucarion maurae* Grummann 1937 (phantom)
- *Verrucarion maurae* Klika 1948 (2b)
- *Verrucarion maurae* Mattick 1951 (2b)
- *Xanthorion hygrohalinum* Mattick 1951 (2b)
- *Verrucarion maurae* Klement 1953 (2b)
- *Verrucarion marinum* Klement 1955 (34a)
- *Xanthorion hygrohalinum* Tomaselli 1956 (2b)
- *Lichinion confinis* Klement 1958 (2b)
- *Caloplacion marinae* Follmann 1990 (2b)
- *Verrucarion maurae* Follmann 1990 (2b)

SAP *Schistidietea apocarpi* Ježek et Vondráček 1962

Bryophyte communities on exposed limestone rocks and screes

- *Grimmietea anodontis* Hadač et Vondráček in Ježek et Vondráček 1962 (2b, 3f)

sap01 The original diagnosis of the name *'Grimmietea anodontis'* (Ježek & Vondráček 1962) is based on the order *Grimmietalia anodontis* Šmarda et Vaněk in Šmarda 1947 that is itself based on the alliance *Grimmion tergestinae* Šmarda 1947. However, as the original diagnosis of the alliance does not contain the name-giving taxon *Grimmia anodon*, the name of the order is invalidly published (ICPN art. 3f) and, as a consequence, the name of the class is invalid as well (ICPN art. 2b). (HB)

- *Grimmietea anodontis* Mohan 1978 (2b)

SAP-01 *Schistidietalia apocarpi* Ježek et Vondráček 1962

Bryophyte communities on exposed limestone rocks and screes

- *Grimmietalia anodontis* Šmarda et Vaněk in Klika et Hadač 1944 (2b)
- *Grimmietalia anodontis* Šmarda et Vaněk in Šmarda 1947 (3f)
- *Grimmietalia anodontis* Šmarda et Vaněk ex Klika 1948 (2b)
- *Grimmietalia anodontis* Šmarda et Vaněk ex Mohan 1978 (2b)

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SAP-01A *Grimmion tergestinae* Šmarda 1947 *nom. conserv. propos.*

Bryophyte communities on exposed limestone rocks and screes

sap02 Marstaller (2006) proposed to conserve the commonly used name *Grimmion tergestinae* Šmarda ex Klika 1948 against the name *Tortulion muralis* von Krusenstjerna 1945. The name *Grimmion tergestinae* Šmarda ex Klika 1948 is not validly published and we propose the *Grimmion tergestinae* Šmarda 1947 for conservation against the *Tortulion muralis* von Krusenstjerna 1945. The names described by Šmarda (1947) are validly published since Šmarda's 'sociations' are considered at the same time as associations (see Remark *cer01*). (HB)

- *Grimmion tergestinae* Šmarda et Vaněk in Klika et Hadač 1944 (2b)
- *Muralion* von Krusenstjerna 1945 (orig.form) (syntax. syn.)
- *Grimmion tergestinae* Šmarda ex Klika 1948 (3f)

sap03 Although Klika (1948) listed *Grimmia tergestina* as a character-species, this name-giving taxon does not occur in the original diagnosis of the alliance, i.e. in the tables of the 'ass. à *Grimmia orbicularis'* (Allorge 1922), 'ass. à *Grimmia anodon-Syntrichia ruralis calcicola*' (Giacomini 1940 '1939') and the '*Grimmia pulvinata-Orthotrichium anomalum* ass.' (Stodiek 1937). (HB)

- *Crossidion squamiferi* Giacomini 1951 (syntax.syn.)
- *Schistidion apocarpi* Ježek et Vondráček 1962 (syntax.syn.)
- *Grimmion anodontis* Šmarda et Vaněk ex Mohan 1978 (2b)
- *Tortulion atrovirentis* Marstaller 1984 (syntax.syn.)

RAC *Racomitrietea heterostichi* Neumayr 1971

Bryophyte communities on sunny exposed siliceous rocks, boulders and screes

- *Schistidietea maritimi* von Hübschmann 1957 (2b)
- *Grimmietea alpestris* Hadač et Vondráček in Ježek et Vondráček 1962 (3f)
- *Grimmio hartmanii-Racomitrietea heterostichi* Hertel 1974 (3b)
- *Grimmio hartmanii-Racomitrietea heterostichi* Hertel ex Mohan 1978 (syntax.syn.)

RAC-01 *Grimmietalia commutatae* Šmarda et Vaněk in Šmarda 1947

Bryophyte communities on sunny exposed siliceous rocks, boulders and screes

- *Grimmietalia alpestris* Hadač et Šmarda in Klika et Hadač 1944 (3f)
- *Grimmietalia alpestris* Šmarda 1944 (3f)
- *Grimmietalia commutatae* Šmarda et Vaněk in Klika et Hadač 1944 (2b)
- *Grimmietalia alpestris* Šmarda 1947 (3f)
- *Grimmietalia alpestris* Hadač et Šmarda in Klika et Hadač ex Klika 1948 (3f)
- *Grimmietalia hartmanii* Philippi 1956 (syntax.syn.)
- *Racomitrietalia heterostichi* Philippi 1956 (syntax.syn.)
- *Schistidietalia maritimi* von Hübschmann 1957 (2b)
- *Grimmietalia decipientis* Varo et Zafra 1990 (syntax.syn.)

RAC-01A *Grimmion commutatae* von Krusenstjerna 1945

Bryophyte communities on dry and sunny siliceous rocks, boulders and screes in lowlands of the cool temperate and mediterranean zones

- *Grimmion commutatae* von Krusenstjerna et Šmarda in Klika et Hadač 1944 (2b)
- *Grimmion commutatae* von Krusenstjerna et Šmarda in Šmarda 1947 (31)
- *Hedwigion albicantis* Philippi 1956 (3b)
- *Hedwigion albicantis* Philippi ex von Hübschmann 1967 (syntax.syn.)
- *Grimmio-Racomitrion heterostichi* Marstaller 1982 (3g)
- *Grimmia azorica-Ptycomitrium alliance* Sjögren 1990 (3h, 5)
- *Grimmion decipientis* Varo et Zafra 1990 (syntax.syn.)
- *Ptychomitrion azoricae* Sjögren 1993 (5)
- *Ptychomitrion azoricae* Sjögren 1995 (1)
- *Ptychomitrion azoricae* Sjögren 1997 (2b)

RAC-01B *Andreaeion petrophilae* Šmarda 1944

Bryophyte communities on dry, exposed siliceous rocks, boulders and screes in the boreal and arctic zones and at high altitudes of the cool temperate zone

- *Andreaeion rupestris* Šmarda in Klika et Hadač 1944 (29c)

rac01 Andreaea petrophila Fürnr. is a synonym of *A. rupestris* Hedw. Šmarda (1944) was cited in Klika & Hadač (1944) and therefore we assume that Šmarda (1944) should have priority over Klika & Hadač (1944). (HB)

RAC-01C *Andreaeion nivalis* Krajina 1933

Bryophyte communities on sporadically inundated siliceous rocks of arctic-alpine distribution

RAC-01D *Grimmion maritimi* Hadač ex Frahm 1974

Bryophyte communities on exposed siliceous rocks in the supralittoral zone of rocky shores

- *Schistidion maritimae* Hadač in Klika et Hadač 1944 (phantom)
- *Grimmion maritimae* Hadač in Klika 1948 (2b)
- *Grimmion maritimi* Hadač in Klika ex von Hübschmann 1957 (2b)

RAC-01E *Grimmio hartmanii-Hypnion cupressiformis* Philippi 1956 *nom. conserv. propos.*

Perennial bryophyte communities on shaded siliceous boulders and rocks

rac02 Marstaller (1993: 535) proposed to conserve the name *Grimmio hartmanii-Hypnion cupressiformis* Philippi 1956 against the *Plagiothecion denticulati* von Krusenstjerna

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1945 that has rarely been used in literature. Marstaller (2006: 136) also proposed rejection of the name *Grimmio hartmanii-Isothecion myuri* Philippi 1956 because he considered the type association to be a *nomen dubium* (ICPN art. 37). (HB)

- *Plagiothecion denticulati* von Krusenstjerna 1945 (syntax. syn.)
- *Grimmio hartmanii-Isothecion myuri* Philippi 1956 (syntax. syn.)
- *Grimmion hartmanii* Sjögren 1964 (syntax.syn.)
- *Grimmion hartmanii* Hertel 1974 (syntax.syn.)

RAC-01F *Racomitrion lanuginosi* von Krusenstjerna 1945

Wefts and mats of bryophytes on lava streams, boulder fields and occasionally on stabilized soil in regions of oceanic climate

rac03 The *Racomitrion lanuginosi* von Krusenstjerna 1945 was described in a broad meaning including syntaxa from acidic rock and shallow soil on rock outcrops. The type association of this alliance is the *Racomitrietum lanuginosi* von Krusenstjerna 1945, the original diagnosis of which shows ambiguity in terms of species composition accomodating species typical of both, acidic rock and stabilized soil. Marstaller (2006) classified the alliance *Racomitrion lanuginosi* in the class *Ceratodonto-Polytrichetea* and order *Polytrichetalia piliferi*. (HB)

CTE *Ctenidietea mollusci* von Hübschmann ex Grgić 1980

Bryophyte communities on shaded, moist to temporarily dry base-rich rocks and occasionally on calcareous soil surfaces

- *Ctenidietea mollusci* von Hübschmann 1957 (2b)
- *Tortulo-Homalothecietea sericei* Hertel 1974 p.p. (3b)
- *Tortulo-Homalothecietea sericei* Hertel ex Mohan 1978 p.p. (3f)

CTE-01 *Ctenidietalia mollusci* Hadač et Šmarda in Klika et Hadač 1944

Bryophyte communities on shaded, moist to temporarily dry base-rich rocks and occasionally on calcareous soil surfaces

- *Ctenidietalia mollusci* Hadač et Šmarda in Šmarda 1947 (31)
- *Ctenidietalia mollusci* Hadač et Šmarda ex Klika 1948 (29c)

CTE-01A *Ctenidion mollusci* Ştefureac 1941

Montane bryophyte communities on shaded, moist to temporarily dry, base-rich rocks and occasionally on calcareous soil surfaces

cte01 Marstaller (2006) considered the association names in Ştefureac (1941) as dubious and, therefore, rejected the name *Ctenidion mollusci* based upon them (ICPN art. 38). We retain the latter name despite Ştefureac's relevés being complex, as many of these relevés do fall within the context of the *Ctenidion* associations. Marstaller (1983) lectotypified the *Ctenidion* Ştefureac 1941 using the name '*Tortello-Ctenidietum mollusci* Stodiek 1937'. No such association exists, but the relevé Marstaller (l.c.) has chosen as the type of the association belongs to the illegitimate '*Encalypta contorta-Tortella tortuosa-Ctenidium molluscum*-Assoziation'. (HB)

- *Tortellion tortuosae* Ştefureac 1941 (syntax.syn.)

cte02 Marstaller (2006) considered the name of this alliance as dubious because of the rather large plot size used by Ştefureac (1941), with the consequence that species of the alliances *Ctenidion* and *Rhytidion* occur together in one sample. However, even though *Ctenidium molluscum* does not occur in the relevés, the species combination suggests classification of this vegetation well within the *Ctenidion*. (HB)

- *Tortellion* von Krusenstjerna 1945 (2b)
- *Ctenidion mollusci* Šmarda 1947 (31)
- *Trichostomion crispuli* Marstaller 1983 (syntax.syn.)

CTE-01B *Distichion capillacei* Gjaerevoll 1956

Subalpine, alpine and nival bryophyte communities on shaded, moist to temporarily dry, base-rich rocks and occasionally on calcareous soil surfaces

- *Encalyption streptocarpae* von Krusenstjerna 1945 (2b)

CTE-01C *Fissidention gracilifolii* Neumayr 1971 *corr.* Marstaller 2001 *nom. conserv. propos.*

Bryophyte communities on shaded and moist vertical rock surfaces or under overhanging rocks

cte03 Marstaller (2006: 84) proposed to conserve the commonly used name *Fissidention gracilifolii* Neumayr 1971 *corr*. Marstaller 2001 against the name *Seligerion* Šmarda 1967. Marstaller (2001: 556, 559) corrected the name-giving species from *Fissidens pusillus* to *Fissidens gracilifolius*. (HB)

- *Seligerion* Šmarda 1967 (syntax.syn.)
- *Fissidention pusilli* Neumayr 1971 (43)
- *Seligerio-Fissidention pusilli* von Hübschmann 1984 (3g)
- *Seligerio-Fissidention pusilli* von Hübschmann 1986 (5)
- *Seligerion calcareae* Marstaller 1987 (syntax.syn.)

CTE-02 *Leprarietalia nivalis* Roux in Roux et al. 2009

Ombrophobic and strongly hygrophilous lichen crusts on vertical calcareous rocks

cte04 The communities of the *Leprarietalia nivalis* are less hygrophytic and more ombrophobic than those of the other orders of the *Ctenidietea*. Roux et al. (2009) considered the order *Leprarietalia nivalis* as a case of *incertae sedis*. It is here tentatively placed in the *Ctenidietea*. Relevés with bryophytes and lichens are needed to clarify the position of the order here or if a new class has to be described. (HB)

CTE-02A *Leprarion nivalis* Roux in Roux et al. 2009

Ombrophobic and strongly hygrophytic lichen crusts on vertical calcareous rocks

- *Lecanactidion stenhammari* Mattick 1951 (2b)

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CLA *Clauzadeetea immersae* Roux in Roux et al. 2009
Endolithic and epilithic crustose lichen communities on nutrient-poor limestone substrates
- *Protoblastenietea immersae* Roux 1978 (3b)
- *Protoblastenietea immersae* Roux 1981 (3b)
- *Clauzadeetea immersae* Bricaud et Roux 1991 (3b)
- *Protoblastenietea immersae* Roux ex von Brackel 1993 (5)

CLA-01 *Thelidietalia decipientis* Roux ex von Brackel 1993
Endolithic and epilithic crustose lichen communities on nutrient-poor calcareous substrates in the montane to alpine belts
- *Thelidietalia decipientis* Roux 1978 (3b)
- *Thelidietalia decipientis* Roux 1981 (3b)

CLA-01A *Aspicilion coeruleae* Roux 1978
Endo- and epilithic crustose lichen communities on nutrient-poor calcareous substrates in fast desiccating habitats in the montane and alpine belts
- *Hymenelion coeruleae* Roux 1978 *nom. mut. propos.* (45)

CLA-01B *Eiglerion homalomorphae* Roux in Roux et al. 2009
Endolithic and epilithic crustose lichen communities on nutrient-poor calcareous substrates in slowly desiccating habitats in the montane to alpine belts

CLA-02 *Verrucarietalia parmigerae* Roux ex von Brackel 1993
Endolithic and epilithic crustose lichen communities on nutrient-poor calcareous substrates in the lowland and colline belts
- *Verrucarietalia parmigerae* Roux 1978 (3b)
- *Verrucarietalia parmigerae* Roux 1981 (3b)
- *Bagliettoetalia parmigerae* Roux ex von Brackel 1993 *nom. mut. propos.* (45)

CLA-02A *Acrocordion conoideae* Roux in Roux et al. 2009
Endolithic and epilithic crustose lichen communities on shaded, nutrient-poor calcareous substrates in habitats with permanently high air humidity in the lowland to colline belts
- *Gyalection cupularis* Mattick 1951 (2b)
- *Acrocordion conoideae* Roux 1978 (3b)
- *Acrocordion conoideae* Roux 1981 (3b)

CLA-02B *Verrucarion sphinctrinellae* Clauzade et Roux 1975
Endolithic and epilithic crustose lichen communities on nutrient-poor calcareous substrates in rather bright habitats with moderately intermittent high air humidity in the lowland to colline belts
- *Bagliettoion parmigerellae* Clauzade et Roux 1975 *nom. mut. propos.* (45)

CLA-02C *Rinodinion immersae* Roux 1978
Endolithic and epilithic crustose lichen communities on nutrient-poor calcareous substrates in habitats with strong changes of moisture and light regimes in the lowland to colline belts
- *Verrucarion calcisedae* Mattick 1951 (2b)

CLA-02D *Verrucarion weddelii* Roux in Roux et al. 2009
Endolithic and epilithic crustose lichen communities on nutrient-poor, porose calcareous substrates in rather bright habitats subject to spills of water in the lowland to colline belts

VNI *Verrucarietea nigrescentis* Wirth 1980
Mainly crustose lichen communities on moderately to highly nutrient-rich limestone substrates
- *Xeroverrucarietea* Mattick 1951 (2b)

VNI-01 *Verrucarietalia nigrescentis* Klement 1950
Mainly crustose lichen communities on highly nutrient-rich limestone substrates
- *Xeroverrucarietalia* Mattick 1951 p.p. (2b)
- *Xeroverrucarietalia* Černohorský et Hadač ex Klement 1955 (31)

VNI-01A *Caloplacion decipientis* Klement 1950 *nom. conserv. propos.*
Mainly crustose and squamulose lichen communities on highly nutrient-rich limestone substrates on calcareous rocks and walls fully exposed to sun and rain
- *Physcion caesiae* Motyka 1924 (phantom)
- *Physcion caesiae* Kušan 1933 (syntax.syn.)

vni01 The original diagnosis of the *Physcion caesiae* (Kušan 1933: 98) contains only the association *Physcietum caesiae* Motyka 1925 and additional relevés. The relevés of the *Physcietum caesiae* belong in part in the nitrophilous *Caloplacion decipientis* Klement 1950 and in part in nutrient-enriched and depauperate vegetation of the subnitrophilous *Aspicilion calcareae* Albertson ex Roux 1978. We choose here the relevé number 9 in Tab. 3 in Motyka (1925: 845) as the *lectotypus hoc loco* of the *Physcietum caesiae* Motyka 1925. Herewith, we place the *Physcion caesiae* Kušan 1933 in synonymy with the *Caloplacion decipientis* Klement 1950. Because the *Physcion caesiae* Kušan 1933 was based on heterogeneous original diagnosis, it has not been applied in the licheno-sociological literature for decades while the *Caloplacion decipientis* Klement 1950 is a well-established name. Therefore we propose the conservation of the *Caloplacion decipientis* Klement 1950 against the *Physcion caesiae* Kušan 1933. (HB, JPT)
- *Caloplacion murorum* Mattick 1951 (2b)
- *Lecanorion galactinae* Laundon 1956 (2b)
- *Physcion caesiae* Motyka ex Beschel 1958 (syntax.syn.)
- *Verrucarion muralis* Gallé 1960 (syntax.syn.)
- *Caloplacion elegantis* Hadač 1962 (3b)
- *Lecanorion dispersae* Laundon 1967 (syntax.syn.)
- *Caloplacion decipientis* Hawksworth 1969 (31)
- *Lecanorion dispersae* Hawksworth 1972 (2b)
- *Aspicilion calcareae* Albertson ex James et al. 1977 *nom. ambig. rejic. propos.* (29c, 36)

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vni02 James et al. (1977: 349) applied the name *Aspicilion calcareae* Albertson ex James et al. 1977 for almost all lichen syntaxa on limestone. These authors placed in the synonymy of their syntaxonomic concept the invalidly published names (spelling as used by the authors) *Aspicilion calcareae* Albertson 1946, *Gyalection cupularis* Mattick 1951, *Lecanactinion stenhammari* Mattick 1951, *Collemation tunaeformis* Degelius 1950, and *Lecanorion galactinae* Laundon 1956 as well as the validly published names *Caloplacion decipientis* Klement 1950, *Caloplacion pyraceae* Klement 1955, *Collemion rupestris* Klement 1955 and *Lecanorion dispersae* Laundon 1967. Obviously the *Aspicilion calcareae* Albertson ex James et al. 1977 is then a *nomen superfluum* (ICPN art. 29c) as it included earlier, validly published alliance concepts. The earliest included alliance is the *Caloplacion decipientis* Klement 1950, with the type association *Caloplacetum murori* Kaiser ex Klement 1950, which is then the type of the *Aspicilion calcareae* Albertson ex James et al. 1977 (ICPN art. 18b). Following this type the subnitrophilous lichen vegetation on limestone would be placed among nitrophilous vegetation, which would be misleading. In addition, the original diagnosis does not include valid syntaxa of subnitrophilous vegetation and thus we suggest rejecting the name *Aspicilion calcareae* Albertson ex James et al. 1977 as a *nomen ambiguum*. Rejection of this name would allow the conservation of the well- established name *Aspicilion calcareae* Albertson ex Roux 1978 for subnitrophilous limestone syntaxa (see Remark *vni04*). (HB)

VNI-01B *Caloplacion arnoldii* Roux in Roux et al. 2009

Mainly crustose lichen communities growing in protected habitats on highly nutrient-rich limestone substrates with only short water spills after rain

VNI-01C *Caloplacion granulosae* Roux in Roux et al. 2009

Mainly crustose lichen communities growing in open habitats on highly nutrient-rich limestone substrates with only short water spills after rain

VNI-02 *Aspicilietalia calcareae* Roux in Roux et al. 2009

Crustose lichen communities on moderately nutrient-rich limestone substrates

- *Xeroverrucarietalia* Černohorský et Hadač in Klika et Hadač 1944 (2b)
- *Xeroverrucarietalia* Černohorský et Hadač ex Šmarda 1947 *nom. dubium* (38)

vni03 The original concept of the order *Xeroverrucarietalia* Hadač 1944 *nom. inval.* comprises vegetation growing on both nutrient-poor and nutrient-rich rocks, nowadays classified in the *Clauzadeetea immersae* and the *Verrucarietea nigrescentis*, respectively. The concept of the *Xeroverrucarietalia* Šmarda 1947 is based on the alliance *Verrucarion sphinctrinae* and a single relevé of the '*Buellia venusta-Verrucaria nigrescens* sociation' containing species of all the three described alliances of the *Aspicilietea calcareae*. It is impossible to ascribe the *Verrucarion sphinctrinae* Šmarda 1947 to any of the three alliances and, moreover, the species concept of *Verrucaria sphinctrina* remains ambiguous. For these reasons we reject the name *Xeroverrucarietalia* Šmarda 1947 as a *nomen dubium*. For the status of the 'sociation' rank in Šmarda (1947), see Remark *cer01*. (HB)

- *Xeroverrucarietalia* Černohorský et Hadač ex Klika 1948 (2b)

VNI-02A *Aspicilion calcareae* Albertson ex Roux 1978 *nom. conserv. propos.*

Crustose lichen communities on slightly damp moderately nutrient-rich and rather protected limestone substrates

vni04 We propose the conservation of the commonly used, although illegitimate, name *Aspicilion calcareae* Albertson ex Roux 1978 (ICPN art. 31) against the names *Caloplacion pyraceae* Klement 1955 (that has been not been used for four decades; see Remark *vni06*) and against the name *Aspicilion calcareae* Albertson ex James et al. 1977 *nom. rejic. propos.* (see Remark *vni02*). (HB)

- *Verrucarion sphinctrinae* Černohorský et Hadač in Klika et Hadač 1944 (2b)
- *Lecanorion calcareae* Albertson 1946 (2b)
- *Verrucarion sphinctrinae* Černohorský et Hadač ex Šmarda 1947 *nom. dubium* (38)

vni05 The *Verrucarion sphinctrinae* Šmarda 1947 is based on a single relevé of the '*Buellia venusta-Verrucaria nigrescens*-sociation'. This relevé includes species belonging to the three alliances described so far for the order *Aspicilietea calcareae*. Therefore, it would be impossible to classify the *Verrucarion sphinctrinae* Šmarda 1947 to any of those recognized alliances. See also Remark *vni03*. (HB)

- *Verrucarion sphinctrinae* Černohorský et Hadač ex Klika 1948 (3f)
- *Lecanorion calcareae* Albertson 1950 (2b)
- *Caloplacion pyraceae* Klement 1955 (syntax.syn.)

vni06 The alliance *Caloplacion pyraceae* Klement 1955 (*holotypus hoc loco*: *Aspicilietum calcareae* Du Rietz ex Klement 1955 (Klement 1955: 73–75) includes the *Aspicilietum calcareae* Du Rietz ex Klement 1955 and the *Aspicilietum contortae* Kaiser ex Klement 1955 (Du Rietz 1925, Kaiser 1926), both classified today in two separate subnitrophilous orders of the class *Verrucarietea nigrescentis*. Of five other associations of the *Caloplacion pyraceae*, the *Caloplacetum variabilis* Kaiser ex Klement 1955 probably belongs in the *Aspicilion calcareae*, however the remaining four associations are classified in other classes: the *Lecideetum juranae* Kaiser ex Klement 1955, *Acarosporetum glaucocarpae* Klement 1955 and *Lecanoretum aghardianae* Motyka ex Klement 1955 in the non-nitrophilous class *Clauzadeetea immersae* Roux 2009 and the *Gyalectetum jenensis* Klement

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1955 in the shade-avoiding *Roccelletea phycopsis* Egea 2015. In addition, the species concept of *Caloplaca pyracea auct.* was ambiguous at that time and we can only assume that this taxon is the species now names *Caloplaca oasis* (A. Massal.) Szatala. Because of the problematic species concept of *Caloplaca pyracea*, the name *Caloplacion pyraceae*, unlike the name *Aspicilion calcareae* Roux 1978, has not been used in current literature. (HB, JPT)

- *Lecanorion calcareae* Hawksworth 1972 (2b)

VNI-02B *Acarosporion cervinae* Roux in Roux et al. 2009

Crustose lichen communities on dry exposed moderately nutrient-rich limestone substrates

VNI-02C *Aspicilion contortae* Roux in Roux et al. 2009

Crustose lichen communities on moderately nutrient-rich limestone substrates with increased air humidity often exposed to dewfall

- *Lecanorion calcareae* Hawksworth 1969 p.p. (3f)

VNI-02D *Lecideion gypsicolae* Crespo et Barreno 1975

Crustose lichen communities on moderately nutrient-rich gypsum substrates

vni07 The *Lecideion gypsicolae* was originally classified within the *Fulgensietalia desertori* by Crespo & Barreno (1975), but the dominance of saxicolous-calcicolous species suggests that this alliance belongs to the *Aspicilietalia calcareae*. (HB)

VNI-03 *Lecanoretalia bandolensis* Roux in Roux et al. 2009

Crustose lichen communities of coastal salt-sprayed nutrient-rich rock surfaces

VNI-03A *Lecanorion bandolensis* Roux in Roux et al. 2009

Crustose lichen communities of partly shaded, compact coastal salt-sprayed rock surfaces

VNI-03B *Caloplacion tavaresianae* Roux in Roux et al. 2009

Crustose lichen communities of fully exposed, porose coastal salt-sprayed rock surfaces

RHI *Rhizocarpetea geographici* Wirth 1972

Ombrophilous lichen communities of siliceous rock surfaces

- *Physcietea* Mattick 1951 p.p. (2b)
- *Rhizocarpetea* Mattick 1951 (2b)
- *Physcietea* Hadač 1962 p.p. (2b)
- *Umbilicarietea* Hadač 1962 (2b)
- *Dermatocarpetea miniati* Wirth 1972 (3b)
- *Physcietea caesiae* Dubiel et Olech 1990 (3b)
- *Dermatocarpetea miniati* Wirth 1995 (2b)

RHI-01 *Rhizocarpetalia obscurati* Wirth 1980

Ombrophilous lichen communities of siliceous rock surfaces characterized by increased air humidity

- *Rhizocarpetalia obscurati* Wirth 1972 (3b)

RHI-01A *Lecideion tumidae* Wirth 1972

Ombrophilous lichen communities of siliceous rock surfaces characterized by increased air humidity

- *Lecideion crustulatae* Mattick 1951 (2b)
- *Stereocaulonion* Klement 1969 (orig.form) (3b)
- *Porpidion tuberculosae* Wirth 1972 *nom. mut. propos.* (45)
- *Stereocaulion ramulosi* Follmann 1976 (2b)
- *Stereocaulion vesuviani* Follmann 1990 (syntax.syn.)

RHI-02 *Rhizocarpetalia* Klement 1949 *nom. conserv. propos.*

Ombrophilous lichen communities of siliceous rock surfaces in the lowland to upper montane belts

rhi01 The name *Physcietalia* was used in Šmarda (1947) to accommodate the highly nitrophilous *Xanthorion parietinae* Ochsner ex Šmarda 1947 (*nom. inval.*; ICPN art. 3d) and the non-nitrophilous *Parmelion conspersae* Hadač in Šmarda 1947. Because the '*Xanthorion parietinae* Ochsner ex Šmarda 1947' is invalidly published, the '*Parmelion conspersae* Hadač in Šmarda 1947' is the nomenclatural type of the '*Physcietalia* Šmarda 1947'. As the only *Physcia* species in the original diagnosis of the order is *P. sciastra*, the name can be completed with the taxon epithet to *Physcietalia sciastrae* Šmarda 1947 (ICPN Rec. 10C). *Physcia* is a genus of highly nitrophilous species and applying the name *Physcietalia sciastrae* for non-nitrophilous lichen vegetation would become a source of misunderstanding (*nomen ambiguum;* ICPN art. 36) and therefore we suggest the rejection of the name *Physcietalia sciastrae* Hadač in Šmarda 1947 in favour of a well established name. The name *Rhizocarpetalia* Klement 1950 is indeed well established, however it is a younger homonym of the *Rhizocarpetalia* Klement 1949 which we propose to conserve. The *lectotypus hoc loco* of the *Rhizocarpetalia* Klement 1949 is the *Acarosporion fuscatae* Klement 1949 in Klement (1949: 12). (HB)

- *Physcietalia sciastrae* Hadač in Šmarda 1947 *nom. ambig. rejic. propos.* (36)
- *Rhizocarpetalia* Klement 1950 *nom. rejic. propos.*
- *Rhizocarpetalia geographici* Klement 1950 (Rec.10C, 30)

rhi02 Klement (1950) described the order without a taxon epithet. Although more than two *Rhizocarpon* species occur in the original diagnosis, the use of the taxon epithet '*geographicum*' of the most common and typically occurring species became established in the licheno-sociological literature. This is, however, at variance with the requirements of the ICPN (Art. 10c). (HB)

- *Physcietalia caesiae* Mattick 1951 p.p. (2b)
- *Aspicilietalia gibbosae* Wirth 1972 (syntax.syn.)
- *Umbilicarietalia velleae* Creveld 1981 (syntax.syn.)

RHI-02A *Lecanorion montagnei* Llimona in Egea et Llimona 1987

Ombrophilous lichen communities of siliceous, slightly shaded rock surfaces of Southern Europe

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- *Lecanorion montagnei* Llimona et Egea 1984 (2b)
- *Protoparmelion montagnei* Llimona in Egea et Llimona 1987 *nom. mut. propos.* (45)

RHI-02B *Pertusarion leucosorae* Egea et Llimona 1987

Ombrophilous lichen communities of exposed, siliceous rock surfaces in the lowland to upper montane belts of Southern Europe

- *Pertusarion aspergillae* Egea et Llimona 1987 *nom. mut. propos.* (45)

RHI-02C *Dimelaenion radiatae* Llimona 1975

Ombrophilous lichen communities of extremely sunny, dry and warm siliceous rock surfaces of Southern Europe

- *Dimelaenion radiatae* Llimona et Egea 1984 (5)

RHI-02D *Caloplacion irrubescentis* Llimona et Egea 1984

Ombrophilous and slightly nitrophilous lichen communities on exposed siliceous rock surfaces of Southern Europe

rhi03 Llimona & Egea (1984) did not designate explicitly the type association. However, of the subordinate three associations (*Acarosporetum heufleurianae*, *Solenopsoro-Diploicietum subcanescentis*, *Buellio-Caloplacetum littoreae*), the former two are invalidly published because no type relevés were assigned (ICPN art. 5). This leaves the validly described *Buellio caloplacivora-Caloplacetum littoralis* Llimona et Egea 1984 as the only suitable element as the type of the name and, therefore, the alliance is deemed validly described (ICPN art 5). (HB)

- *Caloplacion irrubescentis* Llimona et Egea in Egea et Llimona 1987 (31)

RHI-02E *Parmelion conspersae* Hadač in Klika et Hadač 1944

Ombrophilous lichen communities on horizontal or slightly inclined faces of siliceous rocks

- *Rhizocarpion montanum* Černohorský et Hadač in Klika et Hadač 1944 (34a)
- *Parmelion conspersae* Hadač in Šmarda 1947 (31)
- *Acarosporion fuscatae* Klement 1949 (syntax.syn.)
- *Parmelion saxatilis* Klement 1949 (syntax.syn.)
- *Acarosporion fuscatae* Klement 1950 (31)
- *Parmelion saxatilis* Klement 1950 (31)
- *Parmelion conspersae* Mattick 1951 (2b)
- *Rhizocarpion montanum* Mattick 1951 (2b)
- *Xanthoparmelion conspersae* Follmann 1990 (3f)

RHI-02F *Umbilicarion hirsutae* Černohorský et Hadač in Klika et Hadač 1944

Ombrophilous communities of umbilicate lichens on vertical faces of siliceous rocks

- *Umbilicarion hirsutae* Černohorský et Hadač in Šmarda 1947 (29c)
- *Umbilicarion hirsutae* Mattick 1951 (2b)

RHI-03 *Acarosporetalia sinopicae* Creveld 1981

Ombrophilous lichen communities on siliceous rocks rich in heavy metals such as iron, copper, zinc and lead

RHI-03A *Acarosporion sinopicae* Wirth 1972

Ombrophilous lichen communities on acidic rocks rich in heavy metals such as iron, zinc and lead

- *Acarosporion sinopicae* Wirth ex James et al. 1977 (29c)

RHI-03B *Lecideion inopsis* Purvis in Purvis et Halls 1996

Ombrophilous lichen communities on alkaline rocks rich in copper or other heavy metals

RHI-04 *Umbilicarietalia* Oberd. ex Klika et Hadač 1944

Ombrophilous lichen communities on siliceous rock surfaces and boulders in the upper montane to nival belts and the arctic zone

rhi04 The name '*Umbilicarietalia* Oberd.' ex Klika & Hadač 1944 (Klika & Hadač 1944: 252) is used in a broad sense, without a taxon epithet. It includes the alliances '*Rhizocarpion alpinum* Frey 1933' and '*Rhizocarpion montanum* Černohorský et Hadač in Klika et Hadač 1944' (both illegitimate names; ICPN art. 34),the '*Umbilicarion cylindricae* Frey 1933', the '*Umbilicarion hirsutae Černohorský et Hadač in Klika et Hadač 1944*' (both legitimate and validly published names), as well as the '*Rhizocarpion lavati* Hadač in Klika et Hadač 1944' and the '*Dermatocarpion rivulorum* Hadač in Klika et Hadač 1944' (both invalidly published names; ICPN art. 2b). Creveld (1981) proposed the '*Umbilicarion cylindricae* Gams 1927' as the nomenclatural type of the order. However, the name used by Gams (1927: 233), '*Gyrophorion*', is a *nomen nudum* and thus cannot serve as type. From Klika and Hadač (1944) we select here the *Umbilicarion cylindricae* Frey 1933 (Frey 1933: 40–41, 43) as the new type (*lectotypus hoc loco*) of the *Umbilicarietalia* Oberd. ex Klika et Hadač 1944. (HB)

- *Umbilicarietalia* Oberd. 1938 (2b)
- *Umbilicarietalia cylindricae* Oberd. ex Klika et Hadač 1944 (Rec.10C, 30)

rhi05 The order *Umbilicarietalia* Oberd. ex Klika et Hadač 1944 (Klika & Hadač 1944: 252) was used in a broad sense by Klika & Hadač (1944) and without any epithet (see Remark *rhi04*). The original diagnosis includes two alliances, named after two different *Umbilicaria* species, such as the *Umbilicarion cylindricae* of high altitudes and the *Umbilicarion hirsutae* of low altitudes (for the authorities see Remark *rhi04*). Since the low-altitudinal *Umbilicarion hirsutae* is today classified in the *Rhizocarpetalia* Klement 1949, the high-altitudinal *Umbilicarietalia* Oberd. ex Klika et Hadač 1944 became established with the taxon epithet of *Umbilicaria cylindrica*. (HB)

- *Umbilicarietalia* Mattick 1951 (2b)
- *Umbilicarietalia cylindricae* Wirth 1972 (syntax.syn.)
- *Rhizocarpetalia alpicolae* Creveld 1981 (syntax.syn.)

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RHI-04A *Umbilicarion cylindricae* Frey 1933
Ombrophilous communities of umbilicate lichens on tops and vertical faces of siliceous rock surfaces and boulders in the upper montane to nival belts and the arctic zone
- *Gyrophorion* Gams 1927 (2b)
- *Umbilicarion cylindricae* Rübel 1933 (2b)
- *Umbilicarion cylindricae* Mattick 1951 (2b)
- *Umbilicarion havaasii* Creveld 1981 (syntax.syn.)

RHI-04B *Rhizocarpion alpicolae* Frey ex Klement 1955
Ombrophilous communities of crustose lichens on exposed siliceous rock surfaces and boulders in the upper montane to nival belts and the arctic zone
- *Rhizocarpion alpinum* Frey 1933 (34a)
- *Rhizocarpion alpinum* Rübel 1933 (2b)
- *Rhizocarpion alpinum* Mattick 1951 (2b)

RHI-05 *Parmelietalia saxatilis* Wirth 1972
Ombrophilous lichen communities on siliceous rock surfaces and boulders with thin layers of humus or algal mats on flat or slightly inclined rock faces

RHI-05A *Crocynio membranaceae-Hypogymnion physodis* Wirth 1972
Ombrophilous lichen communities on siliceous rock surfaces and boulders with thin layers of humus or algal mats on flat or slightly inclined rock faces
- *Umbilicarion cylindricae* Hawksworth 1969 (31)

RHI-05B *Racomitrio-Hypogymnion intestiniformis* Creveld 1981
Ombrophilous lichen communities on the surfaces of siliceous boulders with thin layers of humus or algal mats in habitats characterized by prolonged snow-cover in the arctic-alpine regions

RHI-06 *Rinodino confragosae-Rusavskietalia elegantis* Creveld in Bültmann et al. 2015
Ombrophilous subnitrophilous lichen communities on slightly acidic siliceous rocks
- *Neuropogonetalia* Mattick 1951 (2b)
- *Physcietalia caesiae* Mattick 1951 p.p. (2b)
- *Physcietalia* Hadač 1962 (2b)
- *Physcietalia caesiae* Mattick ex Creveld 1981 (5)
- *Rinodino confragosae-Xanthorietalia elegantis* Creveld 1981 (5)

RHI-06A *Lecanorion rubinae* Frey 1933
Ombrophilous and sub-nitrophilous to strongly ornitho-coprophilous lichen communities mainly on acidic to base-rich siliceous rocks in the subalpine to nival belt, arctic zone and on coastal rocks
- *Omphalodinion rubinae* Frey 1933 *nom. mut. propos.* (45)
- *Ramalinion capitatae* Rübel 1933 (2b)
- *Rhizoplacion chrysoleucae* Frey 1933 *nom. mut. propos.* (45)
- *Ramalinion capitatae* Rübel ex Klika 1948 (syntax.syn.)
- *Ramalinion strepsilis* Mattick 1951 (2b)
- *Lecanorion rubinae* Frey ex Klement 1955 (syntax.syn.)
- *Omphalodinion rubinae* Follmann 1976 (2b)
- *Dimelaenion oreinae* Creveld 1981 (syntax.syn.)
- *Ramalinion capitatae* Rübel ex Creveld 1981 (31)
- *Candelariellion arcticae* Dubiel et Olech 1990 (3b)
- *Ramalinion siliquosae* Follmann 1990 (syntax.syn.)

RHI-06B *Physcion dimidiatae* Wirth 1972
Ombrophilous thermophilous lichen communities on slightly acidic siliceous rocks in the lowland to montane belts
- *Xanthorion parietinae* Ochsner ex Šmarda 1947 p.p. (3f)
- *Xanthorion substellaris* Mattick 1951 (2b)

RHI-06C *Rhizocarpo geographici-Rusavskion elegantis* Creveld in Bültmann et al. 2015
Ombrophilous lichen communities on rain-exposed base-rich siliceous rocks
- *Neuropogion melaxanthi* Mattick 1951 (2b)
- *Physcion caesiae* Mattick 1951 (2b)
- *Caloplacion elegantis* Hadač 1962 (2b, 3b)
- *Rhizocarpo-Xanthorion* Creveld 1981 (3g)
- *Xanthorion elegantis* Dubiel et Olech 1990 (3b)

ACA *Aspicilietea candidae* Asta et Roux ex Roux in Bültmann et al. 2015
Crustose lichen communities on calcareous schists and decalcified calcareous rocks covered by snow only for a short-time in the subalpine and alpine belts
- *Aspicilietea candidae* Asta et Roux 1977 (3b)
- *Aspicilietea candidae* Asta et Roux in Roux 1981 (3b)

ACA-01 *Aspicilietalia verruculosae* Asta et Roux ex Roux in Bültmann et al. 2015
Sub-thermophilous and sub-xerophilous crustose lichen communities on calcareous schists and decalcified calcareous rocks in the subalpine and alpine belts
- *Aspicilietalia verruculosae* Asta et Roux 1977 (3b)
- *Aspicilietalia verruculosae* Asta et Roux in Roux 1981 (3b)

ACA-01A *Aspicilion mashiginensis* Asta et Roux ex Roux in Bültmann et al. 2015
Sub-thermophilous and sub-xerophilous crustose lichen communities on calcareous schists and decalcified calcareous rocks with low content of carbonate in the subalpine and alpine belts
- *Aspicilion mastrucatae* Asta et Roux 1977 (3b)
- *Aspicilion mastrucatae* Asta et Roux in Roux 1981 (3b)

ACA-01B *Teloschistion contortuplicati* Roux in Bültmann et al. 2015
Sub-thermophilous and sub-xerophilous crustose lichen communities on calcareous schists and decalcified calcareous rocks with higher content of carbonate in the subalpine and alpine belts

ACA-02 *Lecideetalia confluescentis* Roux in Bültmann et al. 2015
Crustose lichen communities on calcareous schists and decalcified calcareous rocks in the subalpine and alpine belts

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ACA-02A *Lecideion confluescentis* Roux in Bültmann et al. 2015

Crustose lichen communities on calcareous schists and decalcified calcareous rocks in the subalpine and alpine belts

POR *Porpidietea zeoroidis* Roux in Bültmann et al. 2015

Crustose lichen communities on calcareous schists and decalcified calcareous rocks covered by snow for a long-time in the subalpine and alpine belts

POR-01 *Porpidietalia zeoroidis* Asta et Roux ex Roux in Bültmann et al. 2015

Crustose lichen communities on calcareous schists and decalcified calcareous rocks covered by snow for a long-time in the subalpine and alpine belts

POR-01A *Porpidion zeoroidis* Asta et Roux ex Roux in Bültmann et al. 2015

Crustose lichen communities on calcareous schists and decalcified calcareous rocks covered by snow for a long-time in the subalpine and alpine belts

- *Huilion macrocarpae-trullisatae* Asta et Roux 1977 (3b)
- *Huilion macrocarpae-trullisatae* Asta et Roux in Roux 1981 (3b)

COL *Collematetea cristati* Wirth 1980

Communities of jelly lichens on calcareous or base-rich siliceous rocks in fissures and in rain tracks temporarily watered by seepage or trickling waters

- *Peltuletea euplocae* Llimona et Egea 1985 (3b)

COL-01 *Collematetalia cristati* Wirth 1980

Communities of jelly lichens on calcareous rocks in fissures and in rain tracks temporarily watered by seepage or trickling waters

- *Toninietalia candidae* Mattick 1951 (2b)

COL-01A *Collemation tuniformis* Klement 1955 *corr.* Wirth 1980

Sciophilous communities of jelly lichens on calcareous rocks in fissures and in rain tracks temporarily watered by seepage or trickling waters

col01 The name-giving taxon *Collema rupestris* of the alliance *'Collemion rupestris'* in Klement (1955: 89) is a misidentification of *Collema tuniforme* (now *Collema fuscovirens*). Wirth (1980: 30) corrected the name in this respect. (HB)

- *Collemation tunaeformis* Degelius in Degelius et von Krusenstjerna 1950 (orig.form) (2b)
- *Toninion candidae* Mattick 1951 (2b)
- *Collemation tunaeformis* Degelius 1954 (orig.form) (2b)
- *Collemion rupestris* Klement 1955 (orig.form) (43)
- *Collemation tuniformis* Degelius ex Hawksworth 1969 (2b)
- *Collemation fuscovirentis* Klement 1955 *corr.* Wirth 1980 *nom. corr. propos.* (*corr.superfl.)*

COL-01B *Peccanion coralloidis* Moreno et Egea ex Egea in Bültmann et al. 2015

Sub-heliophilous communities of jelly lichens on calcareous rocks in fissures and in rain tracks temporarily watered by seepage or trickling waters

- *Dermatocarpion miniati* Mattick 1951 p.p. (2b)
- *Peccanion coralloidis* Moreno et Egea 1991 (3b)
- *Psorotichion schaereri* Wirth 1995 (3b)

COL-02 *Peltuletalia euplocae* Morena et Egea ex Egea in Bültmann et al. 2015

Communities of jelly lichens on base-rich siliceous rocks in fissures and in rain tracks temporarily watered by seepage or trickling waters

- *Peltuletalia euplocae* Llimona et Egea 1985 (3b)
- *Peltuletalia euplocae* Morena et Egea 1991 (3b)

COL-02A *Peltulion euplocae* Llimona et Egea 1984

Communities of jelly lichens on base-rich siliceous rocks in fissures and in rain tracks temporarily watered by seepage or trickling waters

col02 Llimona & Egea (1984: 92) published the name '*Peltulion euplocae* Llimona et Egea 1984', presumably with the intention to describe the alliance in a following publication (Llimona & Egea 1985). However, the original diagnosis of the alliance containing only the new association *Peltuletum obscuranto-euplocae* Lliomona et Egea 1984, which is validly published with a single relevé in accordance with ICPN art. 5, the name *'Peltulion euplocae'* is consequently validly published. The character species for the alliance are those given by the authors for the association (ICPN art. 8). (HB)

- *Peltulion euplocae* Llimona et Egea 1985 (31)

LCH *Leprarietea chlorinae* Wirth 1972

Ombrophobic lichen communities on acidic rocks

- *Chrysotrichetea chlorinae* Wirth 1972 *nom. mut. propos.* (45)

LCH-01 *Leprarietalia chlorinae* Hadač ex Wirth 1972

Ombrophobic lichen communities on acidic rocks

- *Leprarietalia* Hadač in Klika et Hadač 1944 (2b)
- *Leprarietalia* Hadač ex Klika 1948 (2b)
- *Leprarietalia* Mattick 1951 (2b)
- *Chrysotrichetalia chlorinae* Wirth 1972 *nom. mut. propos.* (45)

LCH-01A *Leprarion chlorinae* Šmarda et Hadač ex Wirth 1972 *nom. conserv. propos.*

Photophytic to moderately sciophilous ombrophobic communities of leprose lichens on acidic rocks

lch01 In contrast to the well-established name '*Leprarion chlorinae* Šmarda et Hadač ex Wirth 1972', the name '*Crocynion membranaceae* Klement 1950' has not been used in recent literature. Therefore, we propose to conserve the later name *'Leprarion chlorinae'* against the earlier *'Crocynion membranaceae'*. (HB)

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- *Leprarion chlorinae* Šmarda et Hadač in Klika et Hadač 1944 (3f)
- *Leprarion chlorinae* Šmarda et Hadač ex Klika 1948 (3f)
- *Crocynion membranaceae* Klement 1950 (syntax.syn.)

lch02 Lectotypus hoc loco: *Biatoretum lucidae* Klement 1950 (Klement 1950: 254-255). (HB)

- *Leprarion chlorinae* Mattick 1951 (2b)
- *Crocynion membranaceae* Klement 1955 (31)
- *Chrysotrichion chlorinae* Wirth 1972 *nom. mut. propos.* (45)

LCH-01B *Cystocoleion nigri* Wirth 1972

Strongly sciophilous and aero-hygrophilous ombrophobic lichen communities on acidic rocks

ROC *Roccelletea phycopsis* Egea in Bültmann et al. 2015

Ombrophobic and aero-hygrophilous rock lichen communities on calcareous and subacidic substrates of mainly Southern Europe and North Africa

- *Physcietea* Mattick 1951 p.p. (2b)
- *Physcietea* Tomaselli 1956 (2b)
- *Roccelletea phycopsis* Egea 1989 (3b)
- *Roccelletea phycopsis* Follmann 1993 (3b)

ROC-01 *Dirinetalia massiliensis* Egea in Bültmann et al. 2015

Ombrophobic and aero-hygrophilous rock lichen communities mainly on carbonate rocks and rarely on base-rich siliceous rocks

- *Dirinetalia massiliensis* Egea 1989 (3b)
- *Roccelletalia vicentinae* Follmann 1993 p.p. (3b)

ROC-01A *Roccellion phycopsis* Egea et Llimona 1984

Ombrophobic and aero-hygrophilous rock lichen communities mainly on carbonate rocks and rarely on base-rich siliceous rocks

- *Roccellion phycopsis* Egea et Llimona in Llimona et Egea 1984 (2b)

ROC-02 *Roccelletalia fuciformis* Egea in Bültmann et al. 2015

Ombrophobic and aero-hygrophilous rock lichen communities on acidic and volcanic rocks

- *Physcietalia caesiae* Mattick 1951 p.p. (2b)
- *Roccelletalia fuciformis* Egea 1989 (3b)
- *Roccelletalia vicentinae* Follmann 1993 p.p. (3b)

ROC-02A *Paralecanographion grumulosae* Egea in Bültmann et al. 2015

Ombrophobic and moderately aero-hygrophilous rock lichen communities on siliceous and volcanic rocks

- *Lecanactidion monstrosae* Egea 1989 (3b)

ROC-02B *Roccellion* Klement 1965

Ombrophobic and highly aero-hygrophilous communities of fruticose lichens on vertical and overhanging cliffs on siliceous and volcanic rocks with an optimum in Macaronesia

- *Roccellion oceanicum* Mattick 1951 (2b)
- *Roccellion tinctoriae* Klement 1965 (40a, *corr.illeg.*)

roc01 Klement (1965: 516) described the '*Roccellion* Klement 1965', listing more than two *Roccella* species as the character species of the alliance. The original diagnosis of the alliance contains only one association – the '*Roccelletum tinctoriae* Klement 1965', in which *Roccella boergesenii*, *R. canariensis*, *R. fuciformis*, *R. maderensis*, *R. teneriffensis*, *R. tinctoria*, *R. tuberculata and R. vicentina* occur. Since several species of *Roccella* are listed in the protologue, it is not admissible to complete the name of the alliance with the taxon epithet '*tinctoria*' according to ICPN Rec. 10C as proposed by Egea & Llimona (1991). (HB)

- *Roccellion oceanicum* Follmann 1967 (2b)
- *Roccellion tinctoriae* Follmann 1973 (29c)
- *Roccellion tinctoriae* Follmann 1976 (29c)
- *Roccellion canariensis* Egea et al. 1987 (syntax.syn.)

EPIPHYTIC AND OTHER BRYOPHYTE AND LICHEN VEGETATION

NEC *Neckeretea complanatae* Marstaller 1986 *nom. conserv. propos.*

Hygrophilous bryophyte and lichen communities of large species forming loose mats on bark and shaded boulders and base-rich rocks

nec01 The type of the broadly conceived class *Hypnetea cupressiformis* Ježek et Vondráček 1962 – the *Hypnetalia cupressiformis* Ježek et Vondráček 1962 – falls within the concept of the *Neckeretea complanatae* Marstaller 1986. As the name *Hypnetea cupressiformis* has not found acceptance in literature, in contrast to the well-established *Neckeretea complanatae* Marstaller 1986, we propose to conserve the name *Neckeretea complanatae* Marstaller 1986 against the name *Hypnetea cupressiformis* Ježek et Vondráček 1962 as well as against the less used name *Anomodonto-Neckeretea* Mamczarz 1978. (HB)

- *Hypnetea cupressiformis* Ježek et Vondráček 1962 (syntax.syn.)
- *Tortulo-Homalothecietea sericei* Hertel 1974 p.p. (3b)
- *Anomodonto-Neckeretea* Mamczarz 1978 (syntax.syn.)

nec02 The class *Anomodonto-Neckeretea* Mamczarz 1978 comprises syntaxa of the *Neckeretea* and the *Ctenidietea*. We are not aware of a typification of the name *Anomodonto-Neckeretea* Mamczarz 1978 and choose here from Mamczarz (1978) the *Antitrichietalia* Šmarda et Hadač in Šmarda 1947 as the *lectotypus hoc loco* (Šmarda 1947: 51). (HB)

- *Tortulo-Homalothecietea sericei* Hertel ex Mohan 1978 p.p. (3f)
- *Lobarietea pulmonariae* Schubert et Stordeur 2011 (5)

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NEC-01 *Neckeretalia complanatae* Ježek et Vondráček 1962

Communities of mat-forming large bryophytes on shaded partly by base-rich or neutral, soil-covered boulders, and occasionally bark or stable soil surfaces

- *Antitrichietalia* Šmarda et Hadač in Šmarda 1947 (31)
- *Hypnetalia cupressiformis* Ježek et Vondráček 1962 (syntax.syn.)

NEC-01A *Neckerion complanatae* Šmarda et Hadač ex Klika 1948 *nom. conserv. propos.*

Communities of mat-forming large bryophytes on shaded partly by base-rich soil-covered boulders, and occasionally bark or stable soil surfaces

nec03 We propose to conserve the established name *Neckerion complanatae* Šmarda et Hadač ex Klika 1948 against the name *Drepanion cupressiformis* Ochsner 1928 as well as against the names *Anomodontion viticulosi* Felföldy 1941, *Amblystegion serpentis* Felföldy 1941, and *Isothecion myuri* Waldheim 1944. All these names have not been in use during the last decades. (HB)

- *Drepanion cupressiformis* Ochsner 1928 (syntax.syn.)

nec04 The *Drepanion cupressiformis* Ochsner 1928, though having a broad meaning in Ochsner (1928), became by typification with the *Drepanietum filiformis* Ochsner 1928 by Marstaller (2006: 129), a synonym of the *Neckerion complanatae*. (HB)

- *Amblystegion serpentis* Felföldy 1941 (syntax.syn.)
- *Anomodontion viticulosi* Felföldy 1941 (syntax.syn.)
- *Homalothecion sericei* Waldheim 1944 (syntax.syn.)
- *Neckerion complanatae* Šmarda et Hadač in Klika et Hadač 1944 (2b)
- *Anomodontion europaeum* Barkman 1958 (34a)
- *Anomodonto-Leucodontion* Barkman 1958 (orig.form) (corresp.; as suballiance)
- *Homalion* Barkman 1958 (orig.form) (corresp.; as suballiance)
- *Anomodontion* Sjögren 1961 (syntax.syn.)
- *Isothecio myuri-Brachythecion velutini* Sjögren 1961 (syntax.syn.)
- *Schistidio-Anomodontion* Sjögren 1964 p.p. (syntax.syn.)

NEC-01B *Plasteurhynchion meridionalis* Guerra et Varo 1981

Communities of mat-forming large bryophytes on neutral soils and humus-rich soils in the (sub)mediterranean scrubs and forests

NEC-02 *Antitrichietalia curtipendulae* Šmarda et Hadač in Klika et Hadač 1944

Hygrophilous bryophyte and lichen communities of large loose-mat forming species on base-rich bark, boulders and rocks in sheltered habitats

nec05 According to Marstaller (2006), the syntaxonomic position of this order remains unresolved. (HB)

- *Lobarietalia* Mattick 1951 (2b)
- *Neckeretalia pumilae* Barkman 1958 (syntax.syn.)
- *Lobarietalia pulmonariae* Schubert et Stordeur 2011 (5)

NEC-02A *Lobarion pulmonariae* Ochsner 1928

Hygrophilous bryophyte and lichen communities of large loose-mat forming species on base-rich bark, boulders and rocks in sheltered habitats

nec06 The communities of the alliance *Lobarion pulmonariae* are characterized by the presence of large foliose lichens and bryophytes characteristic of the *Neckeretea complanatae* and the *Antitrichietalia*, and partly also of the *Frullanio-Leucodontetea*. Marstaller (1986) typified the *Antitrichietalia curtipendulae* Šmarda et Hadač in Klika et Hadač 1944 by selecting the *Lobarion pulmonariae* Ochsner 1928 as the lectotype. (HB)

- *Isothecion vivipari* Ştefureac 1941 (syntax.syn.)

nec07 Marstaller (2006) considered the name *Isothecion vivipari* as a *nomen dubium* (ICPN art. 38). However after the consideration of the tables in Ştefureac (1941) we do not agree. Barkman (1958: 515) included one of the validly described associations by Ştefureac (1941) into the synonymy to the *Antitrichietum curtipendulae*, and we follow by placing the *Isothecion vivipari* in synonymy of the *Lobarion*. (HB)

- *Isothecion myuri* Waldheim 1944 (syntax.syn.)
- *Leucodontion sciuroidis* Waldheim 1944 p.p. (syntax.syn.)
- *Neckerion pumilae* Waldheim 1944 (syntax.syn.)
- *Antitrichion curtipendulae* von Krusenstjerna 1945 (syntax.syn.)
- *Leucodontion sciuroidis* von Krusenstjerna 1945 (as suballiance) (2b)

nec08 Von Krusenstjerna (1945) attached this non-nitrophilous suballiance together with the nitrophilous suballiance '*Eu-Xanthorion* von Krusenstjerna 1945' to the '*Xanthorion* Du Rietz 1945'. (HB)

- *Lobarion pulmonariae* Mattick 1951 (2b)
- *Lobario pulmonariae-Antitrichion curtipendulae* Wirth 1968 (syntax.syn.)

FRU *Frullanio dilatatae-Leucodontetea sciuroidis* Mohan 1978

Epiphytic bryophyte communities on the bark of living trees, epiphyllous on leaves or occasionally epigaeic on humic soil

- *Leucodontetea* von Hübschmann 1957 (3b)
- *Leucodontetea* Plămădă 1982 (syntax.syn.)

FRU-01 *Orthotrichetalia* Hadač in Klika et Hadač 1944

Epiphytic bryophyte communities on nutrient-rich bark of living trees

- *Leucodontetalia sciuroidis* von Hübschmann 1952 (syntax.syn.)
- *Leskeetalia polycarpae* Lecointe 1976 (3b)

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FRU-01A *Ulotion crispae* Barkman 1958

Oceanic epiphytic bryophyte communities on the bark of living trees

- *Hypnion cupressiformis* Felföldy 1941 (31)
- *Leucodontion sciuroidis* Sjögren 1961 (31)

FRU-01B *Syntrichion laevipilae* Ochsner 1928

Xero-thermophilous epiphytic bryophyte communities on the bark of living trees

- *Fabronion pusillae* Barkman 1958 (orig.form) (corresp.; as suballiance)
- *Tortulion laevipilae* Barkman 1958 (orig.form) (corresp.; as suballiance)
- *Frullanion dilatatae* Lecointe 1975 (syntax.syn.)
- *Fabronion pusillae* (Barkman 1958) Gil et Guerra 1981 (syntax.syn.)

fru01 The suballiance *Fabronienion pusillae* Barkman 1958 has been up-ranked to the alliance level by Gil & Guerra (1981). (HB)

- *Fabronion pusillae* von Hübschmann 1986 (5)

FRU-01C *Leskeion polycarpae* Barkman 1958

Epiphytic bryophyte communities on the bark of living trees in occasionally flooded riparian forests

FRU-01D *Ulotion bruchii* Lecointe 1979

Acidophilous epiphytic bryophyte communities on the bark of living trees

- *Hypno resupinati-Lejeunion ulicinae* (Lecointe 1979) Marstaller 1985 (29c)

fru02 For some time *Ulota bruchii* Hornsch. ex Brid. was considered a synonym of *Ulota crispa* (Hedw.) Brid. This would have made the name *Ulotion bruchii* Lecointe 1979 a homonym of the *Ulotion crispae* Barkman 1958 and Marstaller (1985: 349, 351) proposed the new name *Hypno resupinati-Lejeunion ulicinae* (Lecointe 1979) Marstaller 1985 for the *Ulotion bruchii* Lecointe 1979. After *Ulota bruchii* was reinstated as a species in its own right, the new name has become obsolete (Marstaller 2006: 98). (HB)

- *Hypno resupinati-Lejeunion ulicinae* Lecointe 1979 *corr.* Marstaller 1985 (phantom)

fru03 Marstaller (2006: 98) erroneously introduced the name *Hypno resupinati-Lejeunion ulicinae* Lecointe 1979 *corr.* Marstaller 1985 for the *Hypno resupinati-Lejeunion ulicinae* (Lecointe 1979) Marstaller 1985 (*nomen novum)*, which was correctly cited by Marstaller (2006: 142). (HB)

FRU-02 *Dicranetalia scoparii* Barkman 1958

Perennial epiphytic and epigaeic bryophyte communities on humic acid substrates

fru04 Marstaller (2006) and other authors classify the order *Dicranetalia* in the class *Cladonio-Lepidozietea*. (HB)

- *Isothecietalia myosuroidis* von Hübschmann ex Marstaller 1984 (syntax.syn.)

FRU-02A *Dicrano scoparii-Hypnion filiformis* Barkman 1958

Perennial epiphytic and epigaeic bryophyte communities on humic acid substrates of Central Europe

- *Mnio-Plagiothecion sylvaticae* Sjögren 1961 p.p. (syntax.syn.)

FRU-02B *Isothecion myosuroidis* Barkman 1958

Perennial epiphytic and epigaeic bryophyte communities on humic acid substrates of the oceanic regions of Europe and Macaronesia

FRU-03 *Frullanio teneriffae-Leucodontetalia canariensis* Marstaller 1985

Epiphytic bryophyte communities on smooth bark and epiphyllous on sclerophyllous plants of southwestern Europe and Macaronesia

fru05 Marstaller (1985: 351) validly published the name *Frullanio teneriffae-Leucodontetalia canariensis* Marstaller 1985 when he incidentally validated this order using the name '*Echinodio-Neckerion intermediae*' (see Remark *fru06*). Marstaller designated the type as "Holotypus 1. Verband", i.e. the first alliance numbered below for the order. This alliance is the '*Echinodio-Neckerion intermediae* Sjögren 1978', an invalid name, which was, however, validated by Marstaller (1985) in the same paper as the '*Echinodio-Neckerion intermediae* Sjögren ex Marstaller 1985'. Hence the valid name of the first alliance should read '*Echinodio-Neckerion intermediae* Sjögren ex Marstaller 1985' (see Remark *fru06*). (HB, JPT)

FRU-03A *Cololejeunio schaeferi-Porellion canariensis* Zippel 1998

Epiphytic bryophyte communities on the smooth bark of living sclerophyllous trees in sheltered habitats of the laurisilva forest zone of Macaronesia

- *Marchesinion mackaii* Sjögren 1996 (1)
- *Marchesinion mackaii* Sjögren 2003 (2b)

FRU-03B *Echinodio prolixi-Neckerion intermediae* Sjögren ex Marstaller 1985

Epiphytic bryophyte communities on rough bark of large ericoid shrubs and trees in the laurisilva forest zone of Macaronesia

fru06 The name '*Echinodio-Neckerion intermediae*' has not been accepted by Sjögren (1978: 34) in considering it as "n.p." (*nomen provisorium* or 'not published'; Sjögren on p. 15 used "n.p." with *expressis verbis* provisional name '*Cololejeunea-Colurion* n.p.', later he applied only the abbreviation 'n.p.'). Therefore, the name is invalidly published (ICPN 3b). Marstaller (1985: 351) validated incidentally Sjögren's name by designating diagnostic taxa and a type as '*Lectotypus*: 1. Ass.' [*recte: holotypus*], i.e. the first association numbered below for the alliance, namely the '*Echinodietum prolix*i v. Hübschmann

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1971'. The latter name is validly published and there is an unambiguous bibliographical reference to von Hübschmann (1971) in Marstaller (1985). As Sjögren (1978: 256) stated explicitly, *Echinodium prolixum* and *Neckera intermedia* are the name-giving species of the name '*Echinodio-Neckerion intermediae*', the correct citation following ICPN Rec. 10C of the name validated by Marstaller is '*Echinodio prolixi-Neckerion intermediae* Sjögren ex Marstaller 1985'. (HB, JPT)

- *Echinodio prolixi-Neckerion intermediae* Sjögren 1978 (3b)
- *Echinodion prolixi* Sjögren 1993 (5)
- *Echinodion prolixi* Sjögren 1997 *nom. inval. ad interim*

fru07 A retroactive change of the upcoming new version of the ICPN will allow a table of more than three relevés with presence/absence data as a sufficient diagnosis before 1.1.1979. Thus some associations of Sjögren (1975, 1978), which are now considered as invalid because their original diagnoses contain only relevés with presence/absence data, will then be validly published. The alliance '*Echinodion prolixi* Sjögren 1993' (ICPN art. 5) will be validated in Sjögren (1997: 22) by listing only one association, the *Echinodio prolixi-Lepidozietum cupressinae* Sjögren 1978 (Sjögren 1978: 30—43, 62), which will become the nomenclatural type. (HB)

- *Dicranion scottiani* Zippel 1998 (syntax.syn.)

FRU-03C *Ulotion calvescentis* Marstaller 1985

Photophytic epiphytic bryophyte communities in periodically humid habitats in open forests and scrubs of southwestern Europe and Macaronesia

FRU-03D *Aphanolejeuneo microscopicae-Colurion calyptrifoliae* Sjögren *2003 nom. inval.* (3g, 5)

Epiphyllous bryophyte communities on sclerophyllous plants in the laurisilva forest zone of Macaronesia

Cololejeuneo-Colurion calyptrifoliae Sjögren 1978 (3b)

- *Cololejeuneo-Colurion calyptrifoliae* Sjögren 1993 (3g, 5)
- *Cololejeuneo-Colurion calyptrifoliae* Sjögren 1997 (3g, 5)

ARL *Arthonio radiatae-Lecidelletea elaeochromae* Drehwald 1993

Epiphytic crustose lichen communities on neutral to moderately acidic bark of trees

- *Arthonietea radiatae* von Brackel 1993 (3b)
- *Opegraphetea vulgatae* Bricaud 2004 (3b)

ARL-01 *Bacidinetalia phacodis* Bricaud et Roux in Bültmann et al. 2015

Epiphytic crustose lichen communities on neutral to moderately acidic, porose bark of old trees in shaded humid habitats

- *Bacidietalia phacodis* Bricaud et Roux in Bricaud 2004 (3b)

ARL-01A *Agonimion octosporae* Bricaud et Roux in Bültmann et al. 2015

Epiphytic crustose lichen communities on neutral to moderately acidic, porose bark of old trees in shaded humid habitats

- *Bacidion rubellae* Wirth 1995 (3b)
- *Agonimion octosporae* Bricaud et Roux in Bricaud 2004 (3b)

ARL-02 *Graphidetalia scriptae* Hadač in Klika et Hadač 1944

Epiphytic crustose lichen communities on neutral to moderately acidic, smooth bark of trees in moderately humid to moderately dry habitats

- *Graphidetalia scriptae* Mattick 1951 (2b)
- *Graphidetalia scriptae* Tomaselli et De Micheli 1952 (31)
- *Arthonietalia radiatae* Barkman 1958 (syntax.syn.)
- *Lecanoretalia horizae* Crespo 1981 *nom. mut. propos.* (45)
- *Lecanoretalia sienae* Crespo 1981 p.p. (1)

arl01 The order has been proposed to accommodate thermophilous lichen vegetation, including the continental *Lecanorion sienae* and the coastal *Lecanactidion patellarioidis*. Both alliances were validated by Giralt (1996). The *Lecanactidion* belongs in the order *Dendrographetalia decolorantis* but the communities with *Lecanora horiza* (Ach.) Röhl. (syn. *L. laevis* Poelt, *L. siena* B. de Lesd.) are classified in the *Lecanorion subfuscae* by other authors (Barkman 1958; see Van Haluwyn 2010). (HB)

- *Lecanoretalia sienae* Crespo ex Crespo et Bueno 1984 p.p. (2b)
- *Lecanoretalia sienae* Crespo ex Giralt 1996 p.p. (5)
- *Lecanoretalia sienae* Crespo ex Boqueras 2000 p.p. (2b)

ARL-02A *Graphidion scriptae* Ochsner ex Felföldy 1941

Epiphytic crustose lichen communities on neutral to moderately acidic, smooth bark of trees (particularly beech) in shaded and moderately humid habitats

arl02 Felföldy (1941) used the term 'Szoc.' (obviously referring to 'sociation') for associations, and 'assz. csop.' ('association groups') for alliances. He chose those terms, because he wanted to express that the epiphyte syntaxa are a part of the vegetation. However, he stated that he was treating the epiphytic communities as independent associations. Furthermore, he applied the rank-indicating suffixes (*-etum, -ion*) for the associations and alliances respectively. In addition, many of his 'szoc.' and 'assz. csop.' are associations and alliances described by Ochsner (1928). Thus it can be concluded, that the units of Felföldy (1941) with the suffixes (*-etum, -ion*) correspond to associations and alliances of the thallophyte syntaxonomic system and are validly described in the sense of the ICPN Principle II. (HB)

- *Graphidion scriptae* Ochsner 1928 (2b)

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- *Graphidion scriptae* Ochsner ex Klika et Hadač 1944 (31)
- *Graphidion scriptae* Mattick 1951 (2b)
- *Graphidion* Laundon 1958 (2b)
- *Arthonion* Hawksworth 1972 (3a)
- *Graphidion scriptae* Hawksworth 1972 (31)

ARL-02B *Lecanorion carpineae* Ochsner 1928 *corr.* Barkman 1958

Epiphytic crustose lichen communities on neutral to moderately acidic, smooth bark of trees in moderately dry habitats

- *Lecanorion subfuscae* Ochsner 1928 (43)
- *Lecanorion subfuscae* Mattick 1951 (2b)
- *Olivaceion* Laundon 1958 (orig.form) (2b)
- *Lecideion limitatae* Graham 1971 (1)
- *Lecanorion carpineae* Hawksworth 1972 (2b)
- *Olivaceion* Hawksworth 1972 (orig.form) (3a)
- *Lecanorion horizae* Crespo 1981 *nom. mut. propos.* (1, *mut.illeg.*)
- *Lecanorion sienae* Crespo 1981 (1)
- *Lecanorion argentatae* Follmann 1990 (3f)
- *Lecanorion sienae* Crespo ex Giralt 1996 (syntax.syn.)
- *Arthonion albopulvereae* Boqueras 2000 (3b)

arl03 Boqueras (2000) described this provisional alliance for the thermophilous lichen vegetation in well lit habitats on smooth bark. For the time being, it is classified here. (HB)

- *Lecanorion sienae* Crespo 1981 ex Boqueras 2000 (2b)

ARL-03 *Dendrographetalia decolorantis* Bricaud et Roux in Bültmann et al. 2015

Epiphytic crustose lichen communities on neutral to moderately acidic bark of trees of the Mediterranean and the thermoatlantic region of southwestern Europe

- *Schismatommetalia decolorantis* Bricaud et Roux in Bricaud 2004 (3b)
- *Lecanoretalia sienae* Crespo 1981 p.p. (1)
- *Lecanoretalia sienae* Crespo ex Crespo et Bueno 1984 p.p. (2b)
- *Lecanoretalia sienae* Crespo ex Giralt 1996 p.p. (5)
- *Lecanoretalia sienae* Crespo ex Boqueras 2000 p.p. (2b)

ARL-03A *Lecanactidion patellarioidis* Crespo ex Giralt 1996

Epiphytic crustose lichen communities on neutral to moderately acidic bark of trees of the Mediterranean and the thermoatlantic region of southwestern Europe

- *Lecanactidion patellarioidis* Crespo 1981 (1)
- *Lecanactidion patellarioidis* Crespo ex Crespo et Bueno 1984 (2b)
- *Lecanactidion patellarioidis* Crespo ex Atienza et Barreno 1990 (1)
- *Bactrosporion patellarioidis* Crespo ex Giralt 1996 *nom. mut. propos.* (45)
- *Lecanactidion patellarioidis* Crespo ex Boqueras 2000 (5)

HYP *Hypogymnietea physodis* Follmann 1974 *nom. conserv. propos.*

Lichen communities on rough acidic nutrient-poor bark of trees

hyp01 The larger part of the *Usneetea* Tomaselli et De Micheli 1952 and of the *Alectorietea* Hadač 1962 corresponds to the *Hypogymnietea physodis* Follmann 1974. Neither of the names are misleading, but the name *Hypogymnietea physodis* Follmann 1974 is already well-established in the lichenosociological literature and therefore we propose the conservation of the *Hypogymnietea physodis* Follmann 1974 against the name *Usneetea* Tomaselli et De Micheli 1952, as well as against the name *Alectorietea* Hadač 1962. (HB)

- *Usneetea* Mattick 1951 (2b)
- *Usneetea* Tomaselli et De Micheli 1952 (syntax.syn.)
- *Alectorietea* Hadač 1962 (syntax.syn.)
- *Lecanoretea variae* von Brackel 1993 (3b)

HYP-01 *Alectorietalia* Dahl et Hadač in Klika et Hadač 1944

Moderately to highly aero-hygrophilous fruticose and foliose lichen communities on rough acidic nutrient-poor bark of trees

- *Lecideetalia parasemae* Klement 1950 (syntax.syn.)
- *Usneetalia* Mattick 1951 (2b)
- *Usneetalia* Tomaselli et De Micheli 1952 (syntax.syn.)
- *Hypogymnietalia physodo-tubulosae* Barkman 1958 *nom. mut. propos.* (45)
- *Parmelietalia physoso-tubulosae* Barkman 1958 (syntax.syn.)

HYP-01A *Cetrarion pinastri* Ochsner ex Kušan 1933

Foliose lichen communities on acidic nutrient-poor bark of lower parts of tree trunks or on dead wood in habitats with increased air humidity and prolonged snow cover with an optimum in the boreal zone and the montane and subalpine belts of the nemoral zone

- *Cetrarion pinastri* Ochsner 1928 (2b)
- *Cetrarion pinastri* Ochsner ex Klika et Hadač 1944 (31)
- *Cetrarion pinastri* Mattick 1951 (2b)
- *Parmeliopsidion ambiguae* Barkman 1958 (orig.form) (corresp.; as suballiance)

HYP-01B *Parmelion physodis* von Krusenstjerna 1945 *nom. corr. propos.*

Fruticose and foliose lichen communities sensitive to air pollution on acid nutrient-poor bark of trees in habitats with moderate air humidity

hyp02 von Krusenstjerna (1945) described the '*Parmelia physodes*-förbundet' or '*Physodion*' after the species name *Parmelia physodes* (L.) Ach., nowadays named *Hypogymnia physodes* (L.) Nyl. According to the ICPN art. 41, the name of the alliance must be corrected to *Parmelion physodis* von Krusenstjerna 1945. As type the association *Physodeto-Sulcatetum* von Krusenstjerna 1945 *lectotypus hoc loco* is chosen (von Krusenstjerna 1945: 91–92). The name of the

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association must be corrected to *Parmelietum physodo-sulcatae* von Krusenstjerna 1945 *nom corr. hoc loco*. (HB)
- *Physodion* Du Rietz 1945 (orig.form) (2b)
- *Physodion* von Krusenstjerna 1945 (orig.form)
- *Hypogymnion physodis* Beschel 1958 (31)
- *Parmelion furfuraceae* Barkman 1958 (orig.form) (corresp.; as suballiance)
- *Parmelion physodis* Beschel 1958 (31)
- *Parmelion saxatilis* Barkman 1958 (31)
- *Physodion* Laundon 1958 (orig.form) (2b)
- *Physodion* Hawksworth 1972 (orig.form) (31)
- *Parmelion saxatilis* Hawksworth 1972 (3a)
- *Pseudevernion furfuraceae* (Barkman 1958) James et al. 1977 (syntax.syn.)

hyp03 Barkman (1958: 456) validly published the name *'Parmelion furfuraceae'* at the suballiance rank (ICPN art. 3e). This syntaxon was later elevated to the rank of alliance by James et al. (1977: 334). (HB)

HYP-01C *Usneion barbatae* Ochsner 1928

Highly air-pollution sensitive communities of large beard lichens on acidic nutrient-poor bark of trees in habitats with temporary high fog-induced air humidity
- *Usneion barbatae* Mattick 1951 (2b)
- *Usneion dasypogae* Barkman 1958 (syntax.syn.)
- *Usneion florido-ceratinae* Barkman 1958 (3b)
- *Usneion* Hawksworth 1972 (syntax.syn.)
- *Usneion articulatae* Follmann 1990 (2b, 5)

HYP-01D *Parmelion perlatae* (Barkman 1958) James et al. 1977

Highly air-pollution sensitive yet slightly nitrophilous communities of large foliose lichens on moderately acidic to neutral bark in regions of oceanic climate

hyp04 Barkman (1958) described the *Parmelion caperatae* with the rank of suballiance, which was upgraded to alliance by James et al. (1977). The authors had to choose a new name because the alliance *Parmelion caperatae* Felföldy 1941 is validly described (see synonyms of the *Xanthorion parietinae* Ochsner 1928). (HB)
- *Physodion* Almborn 1948 (orig.form) (31)

hyp05 Almborn (1948) described the federation *Physodion* with one union *'Physodeto-sulcatetum'* with two assemblages named '*Lecidea cyathoides* var. *corticola* communities' (according to Barkman (1958) belonging in the *Pertusarietum amarae, Graphidion*) and '*Parmelia revoluta* communities' (according to Barkman (1958) a synonym of the *Parmelietum revolutae, Parmelion perlatae*). The *'Physodion'* Almborn 1948 has been synonymized with an order, the *'Physodeto-sulcatetum'* with an alliance and the 'communities' with associations by Barkman (1958). (HB)
- *Parmelion caperatae* Barkman 1958 (orig.form) (corresp.; as suballiance)
- *Trichoterion* Laundon 1958 (orig.form) (2b)
- *Parmelion perlatae* Follmann 1967 (2b)
- *Trichoterion* Hawksworth 1972 (orig.form) (3a)
- *Pseudoparmelion sorediantis* Crespo 1979 (syntax.syn.)
- *Parmotremion chinensis* Follmann 1990 (2b)

HYP-01E *Parmelion laevigatae* James et al. 1977

Communities of large foliose lichens on very nutrient-poor acid bark in regions of highly oceanic climate

HYP-02 *Lecanoretalia variae* Barkman 1958

Aero-xerophilous and toxitolerant communities of crustose lichens on acidic nutrient-poor bark of trees and occasionally also on leaves

HYP-02A *Lecanorion variae* Barkman 1958

Subaero-xerophilous and sub-toxitolerant crustose lichen communities on acid, nutrient-poor bark
- *Lecideion ostreatae* Laundon 1956 *nom. corr. propos.* (2b, *corr.superfl.*)
- *Lecanorion trabalis* Beschel 1958 (3f)

HYP-02B *Bacidion chlorococcae* Klement 1955

Aero-xerophilous and highly toxitolerant crustose lichen communities on strongly acid, nutrient-poor bark and occasionally also on dead wood, leaves and needles
- *Lecanorion conyzaeae* Duvigneaud 1942 (2b)
- *Scoliciosporion chlorococcae* Klement 1955 *nom. mut. propos.* (45)
- *Conizaeoidion* Laundon 1956 (orig.form) (2b)
- *Conizaeoidion* Laundon 1958 (orig.form) (2b)
- *Conizaeoidion* Laundon 1967 (orig.form) (syntax.syn.)
- *Lecanorion conizaeoidis* Wirth 1995 (2b)

FEL *Fellhaneretea bouteillei* Bricaud et Roux in Bricaud et al. 2009

Epiphyllous lichen communities on leaves of evergreen trees and shrubs having a distribution optimum in Southern Europe
- *Striguletea* Mattick 1951 (2b)

FEL-01 *Fellhaneretalia bouteillei* Bricaud et Roux in Bricaud et al. 2009

Epiphyllous lichen communities on leaves of evergreen trees and shrubs having a distribution optimum in Southern Europe
- *Striguletalia* Mattick 1951 (2b)

FEL-01A *Fellhanerion bouteillei* Bricaud et Roux in Bricaud et al. 2009

Epiphyllous lichen communities on leaves of evergreen trees and shrubs in habitats with frequently shifting microclimatic conditions
- *Strigulion* Mattick 1951 (2b)
- *Tapellarion epiphyllae* Follmann 1990 (2b)
- *Fellhanerion bouteillei* Bricaud 2004 (3b)

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FEL-01B *Bacidinion vasakii* Bricaud et Roux in Bricaud et al. 2009

Epiphyllous lichen communities on leaves of evergreen trees and shrubs in habitats with constant aero-hygrophytic microclimate

- *Bacidinion vasakii* Bricaud 2004 (3b)

PHY *Physcietea* Tomaselli et De Micheli 1952

Nitrophilous and subnitrophilous lichen communities on bark of trees and occasionally on rocks

- *Physcietea* Mattick 1951 p.p. (2b)
- *Physcietea adscendentis* Tomaselli et De Micheli 1952 (Rec.10C, 30)

phy01 Tomaselli & De Micheli (1952: 103) described the class *'Physcietea'* without a taxon epithet, but containing a single order – the *Physcietalia adscendentis* Tomaselli et De Micheli 1952. Despite several other *Physcia* species occur in the original diagnosis of the order, the epithet '*adscendentis*' has become established for the name of the class. This practice remains, however, at variance with the regulations of the ICPN art. 10c. (HB)

- *Physcietea adscendentis* von Brackel 1993 (3b)

PHY-01 *Physcietalia* Hadač in Klika et Hadač 1944

Nitrophilous and sub-nitrophilous lichen communities on bark of trees and occasionally on rocks

phy02 The original diagnosis of the order '*Physcietalia* Hadač in Klika et Hadač 1944' includes besides epiphytic communities also saxicolous syntaxa now transferred to the *Rhizocarpetea geographici* Wirth 1972. Drehwald (1993) typified the order with the epiphytic *Xanthorion parietinae* Ochsner 1928 and the order in current use is applied for corticolous communities. The name is established with the taxon epithet of *Physcia adscendens*. (HB)

- *Physcietalia adscendentis* Hadač in Klika et Hadač 1944 (Rec.10C, 30)
- *Physcietalia adscendentis* Mattick 1951 (2b)
- *Physcietalia adscendentis* Tomaselli et De Micheli 1952 (29c)
- *Physcietalia adscendentis* Mattick ex Barkman 1958 (29c)

PHY-01A *Buellion canescentis* Barkman 1958

Nitrophilous and sub-nitrophilous lichen communities on rough bark of trees and occasionally on rocks, either crustose pioneer communities or communities in slightly humid or shaded habitats

- *Diploicion canescentis* Barkman 1958 *nom. mut. propos.* (45)

PHY-01B *Xanthorion parietinae* Ochsner 1928

Nitrophilous communities of foliose and fruticose lichens on bark of trees and occasionally on rocks in exposed habitats

- *Parmelion caperatae* Felföldy 1941 (syntax.syn.)
- *Eu-Xanthorion* von Krusenstjerna 1945 (orig.form) (corresp.; as suballiance)
- *Xanthorion* Du Rietz 1945 (2b)
- *Teloschisto-Anaptychion leucomelaenae* Mattick 1951 (2b)
- *Xanthorion parietinae* Mattick 1951 (2b)
- *Lecanorion variae* Beschel 1958 (syntax.syn.)
- *Parmelion pictum* Beschel 1958 (orig.form) (34a)
- *Teloschistidion chrysophthalmi* Follmann 1962 (orig.form) (syntax.syn.)
- *Xanthorion* Hawksworth 1972 (syntax.syn.)
- *Teloschistion chrysophthalmi* Follmann 1976 (2b)
- *Heterodermion leucomelae* Follmann 1990 (2b)

LCA *Leprarietea candelaris* Wirth 1980

Ombrophobic lichen communities on rough bark or wood

- *Chrysotrichetea candelaris* Wirth 1980 *nom. mut. propos.* (45)
- *Calicio-Chrysotrichetea candelaris* Wirth ex Drehwald 1993 (3g)

LCA-01 *Leprarietalia* Barkman 1958

Ombrophobic lichen communities on rough bark or wood

- *Leprarietalia candelaris* Barkman 1958 (Rec.10C, 30)
- *Leprarietalia candelaris* Wirth 1980 (29c)
- *Leprarietalia candelaris* Kupfer-Wesley et Türk 1987 (2b)
- *Calicio-Chrysotrichetalia* Wirth ex Drehwald 1993 (3g)

LCA-01A *Calicion hyperelli* Černohorský et Hadač in Klika et Hadač 1944

Ombrophobic communities of calicioid lichens on bark or wood

- *Calicion viridis* Černohorský et Hadač in Klika et Hadač 1944 *nom. mut. propos.* (45)
- *Calicion hyperelli* Mattick 1951 (2b)
- *Coniocybion gracilentae* Klement 1955 (syntax.syn.)

LCA-01B *Leprarion* Almborn 1948

Ombrophobic sub-sciophilous and hygrophilous communities of leprose lichens on bark or wood

- *Leprarion incanae* Almborn 1948 (40a, *corr.illeg.*)
- *Leprarion* Klement 1955 (31)
- *Leprarion* Laundon 1956 (31)
- *Leprarion* Hawksworth 1972 (31)

CLE *Cladonio digitatae-Lepidozietea reptantis* Ježek et Vondráček 1962 *nom. conserv. propos.*

Sub-hygrophilous and hygrophilous bryophyte and lichen communities on decaying organic matter and acidic soils

cle01 The original concept of the *Dicranelletea cerviculatae* von Hübschmann 1957, containing peat-colonizing syntaxa, is a small portion of the *Cladonio-Lepidozietea* as the class is understood today. The well established name *Cladonio digitatae-Lepidozietea reptantis* Ježek et Vondráček 1962, is proposed here for conservation against the older name *Dicranelletea cerviculatae* von Hübschmann 1957 and against the name *Physcomitrelletea patentis* von Hübschmann 1957. The latter class was described to accommodate only one

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association and remained infrequently used in literature. (HB)

- *Dicranelletea cerviculatae* von Hübschmann 1957 (syntax.syn.)
- *Physcomitrelletea patentis* von Hübschmann 1957 (syntax.syn.)
- *Pogonato-Dicranelletea heteromallae* von Hübschmann 1967 (phantom)

cle02 von Hübschmann (1986) listed at p. 80 the name '*Pogonato-Dicranelletea heteromallae* von Hübschmann 1967' and at p. 81 the name '*Pogonato-Dicranelletea heteromallae* von Hübschmann 1975'. However, no such names have ever been published. (HB)

- *Lepidozietea reptantis* Hertel 1974 (3b)
- *Hypnetea uncinati* Lecointe 1975 (syntax.syn.)
- *Pogonato-Dicranelletea heteromallae* von Hübschmann 1975 (phantom)

cle03 see Remark *cle02*. (HB)

- *Lepidozio reptantis-Lophocoleetea heterophyllae* von Hübschmann 1976 (3b)
- *Dicranelletea heteromallae* Mohan 1978 (syntax.syn.)
- *Lepidozietea reptantis* Hertel ex Mohan 1978 (syntax.syn.)
- *Lepidozio reptantis-Lophocoleetea heterophyllae* Mohan 1978 (syntax.syn.)
- *Pogonato-Dicranelletea heteromallae* von Hübschmann ex Guerra et al. 1981 (3g)
- *Tetraphidetea pellucidae* Plămădă 1982 (syntax.syn.)
- *Lepidozietea reptantis* Hertel ex Marstaller 1984 (31)
- *Pogonato-Dicranelletea heteromallae* von Hübschmann 1986 (31)
- *Cladonietea coniocraeae* Schubert et Stordeur 2011 (2b, 5)

CLE-01 *Diplophylletalia albicantis* Philippi 1963 *nom. conserv. propos.*

Sciophilous and sub-hygrophilous bryophyte communities occasionally with lichens on acidic soil and weathered surfaces of moist siliceous rocks

cle04 Marstaller (2006: 27) proposed to conserve the name '*Diplophylletalia albicantis* Philippi 1963' against the name '*Dicranelletalia heteromallae* Philippi 1956' because Philippi (1963) combined these two orders and chose the later name '*Diplophylletalia albicantis'* that is a well-established name today. We propose to conserve the name '*Diplophylletalia albicantis'* against the *name 'Physcomitrelletalia patentis* von Hübschmann 1957'. The latter order, described to accommodate the single alliance *'Physcomitrellion patentis'* with one association, remained almost unknown in the literature. (HB)

- *Dicranelletalia heteromallae* Philippi 1956 (syntax.syn.)
- *Diplophylletalia albicantis* Philippi 1956 (3b)
- *Physcomitrelletalia patentis* von Hübschmann 1957 (syntax.syn.)
- *Dicranelletalia heteromallae* Philippi ex Mohan 1978 (31)

CLE-01A *Pogonation urnigeri* von Krusenstjerna 1945

Sub-hygrophilous bryophyte communities on acidic soils with low humus content

- *Anisothecion vaginale* von Krusenstjerna 1940 (2b)
- *Pogonation* Waldheim 1947 (orig.form) (corresp.; as suballiance)
- *Pogonato-Polytrichion* Waldheim 1947 (29c)
- *Pogonation urnigeri* (von Krusenstjerna 1945) Philippi 1956 (orig.form) (corresp.; as suballiance)
- *Pohlion crudae* Privitera et Puglisi 1996 (syntax.syn.)

CLE-01B *Fissidenti serrulati-Fossombronion angulosae* Marstaller 1993

Sciophilous and hygrophilous bryophyte communities on acidic soil and weathered rock surfaces in moist habitats of the Mediterranean

CLE-01C *Dicranellion heteromallae* Philippi 1963 *nom. conserv. propos.*

Sub-hygrophilous bryophyte communities occasionally with lichens on acidic loamy and gravelly soils

cle05 Following a suggestion by Philippi (1963: 104), Marstaller (1993: 535) proposed to conserve the established name '*Dicranellion heteromallae* Philippi 1963' against the names '*Pogonato urnigeri-Atrichion undulati* von Krusenstjerna 1945', '*Pogonation aloidis* Philippi 1956' and '*Solenostomion crenulati* Philippi 1956'. (HB)

- *Pogonato urnigeri-Atrichion undulati* von Krusenstjerna 1945 (syntax.syn.)
- *Pogonation aloidis* Philippi 1956 (syntax.syn.)
- *Solenostomion crenulati* Philippi 1956 (syntax.syn.)
- *Schistostegion osmundacei* Hertel 1974 (3b)
- *Dicranellion heteromallae* Philippi ex Mohan 1978 (31)
- *Schistostegion osmundacei* Hertel ex Mohan 1978 (2b)
- *Myurium-Allorgea-Fissidens pallidicaulis-alliance* Sjögren 1990 p.p. (orig.form) (3h, 5)
- *Allorgeo berthelotianae-Myurion hochstetteri* Sjögren 1993 p.p. (2b)
- *Andoae-Nardion* Sjögren 1995 (1)
- *Andoae-Nardion* Sjögren 1997 (2b)
- *Andoae berthelotianae-Nardion scalaris* Sjögren 2003 p.p. (3i, 5)

CLE-01D *Diplophyllion albicantis* Philippi 1956

Sciophilous and hygrophilous bryophyte communities on wet siliceous rocks and soil surfaces

- *Brachydontio trichodis-Campylostelion saxicolae* Marstaller 1992 (syntax.syn.)

CLE-01E *Pellion epiphyllae* Marstaller 1984

Sub-sciophilous and hygrophilous bryophyte communities on moist acidic soil surfaces and on soil-covered rocks along rivulets

CLE-01F *Fossombronio-Pohlion annotinae* von Hübschmann 1986

Pioneer bryophyte communities on acidic periodically wet clay or sandy soils

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CLE-01G *Physcomitrellion patentis* von Hübschmann 1957

Pioneer bryophyte communities on silty loam in the supralittoral of eutrophic lakes, pools and rivers

cle06 This unit was classified in the order *Funarietalia hygrometricae* von Hübschmann 1957 by Marstaller (2006). (HB)

CLE-01H *Pseudephemerion nitidi* Marstaller 2006

Pioneer bryophyte communities on silty loam in the supralittoral of oligotrophic to mesotrophic lakes, pools and rivers

cle07 This unit was classified in the order *Funarietalia hygrometricae* von Hübschmann 1957 by Marstaller (2006). (HB)

CLE-02 *Dicranelletalia cerviculatae* von Hübschmann 1957

Pioneer bryophyte and lichen communities on exposed peaty soil

CLE-02A *Dicranellion cerviculatae* von Hübschmann 1957

Pioneer bryophyte and lichen communities on exposed peaty soil

CLE-03 *Lophocoleetalia heterophyllae* Barkman 1958

Sub-hygrophilous and hygrophilous bryophyte and lichen communities on rotting logs and occasionally on humus-covered rocks and soil

- *Cladonio digitatae-Lepidozietalia repentis* Ježek et Vondráček 1962 (syntax.syn.)
- *Lepidozietalia reptantis* Philippi 1965 (29c)

cle08 Philippi (1965: 229) coined the illegitimate name *'Lepidozietalia reptantis'* to replace the name *Lophocoleetalia heterophyllae* Barkman 1958 (ICPN art. 29a). (HB)

- *Cladonietalia coniocraeae* von Brackel 1993 (3b)
- *Cladonietalia coniocraeae* Schubert et Stordeur 2011 (2b, 5)

CLE-03A *Nowellion curvifoliae* Philippi 1965 *nom. conserv. propos.*

Hygrophilous bryophyte communities on rotting logs at early stages of decay and on humus-covered rocks

cle09 Marstaller (2006: 149, 118) considered both the names '*Mnio-Plagiothecion* Ştefureac 1941' and '*Blepharostomion* Barkman 1958' as *nomina dubia*. We do not agree, but propose to conserve the established name *Nowellion curvifoliae* Philippi 1965 against the name *Mnio punctati-Plagiothecion* Ştefureac 1941. (HB)

- *Mnio punctati-Plagiothecion* Ştefureac 1941 (syntax.syn.)
- *Blepharostomion trichophylli* Barkman 1958 (29c)

cle10 Introducing the alliance *'Blepharostomion'*, Barkman (1958: 479) explicitly proposed a superfluous new name for the *Mnio-Plagiothecion* Ştefureac 1941, considering the latter name as misleading. Ştefureac's alliance contains two associations, *Dicranetum montani* Ştefureac 1941 and *Leptoscyphetum taylori* Ştefureac 1941, that were both included in the *'Blepharostomion'* by Barkman (1958). Barkman (1958: 479) selected the *Leptoscyphetum taylori* Ştefureac 1941 as the type of the *Blepharostomion*. (HB)

- *Lepidozio-Scapanion gracilae* Sjögren 1978 (3b)
- *Lepidozion azoricae* Sjögren 1997 *nom. inval. ad interim*

cle11 The name *'Lepidozion azoricae'* might be validly published in Sjögren (1997: 22) with the *Lepidozietum azoricae* Sjögren 1978 as type when the new upcoming edition of the ICPN is published (for the reasoning see Remark *fru07*). (HB)

CLE-03B *Tetraphidion pellucidae* von Krusenstjerna 1945

Hygrophilous sciophilous bryophyte communities occasionally with lichens on rotting logs in late stages of decay and on humus and rocks

- *Anastreption orcadensis* Duda 1951 (syntax.syn.)
- *Anastreption orcadensis* Philippi 1956 (3b)
- *Tetraphido-Aulacomnion* Barkman 1958 (29c)

cle12 Barkman (1958: 482) published explicitly the illegitimate name *'Tetraphido-Aulacomnion'* for the name '*Tetraphidion* von Krusenstjerna 1945' (ICPN art. 29a). (HB)

CLE-03C *Cladonion coniocraeae* Duvigneaud ex James et al. 1977

Sub-hygrophytic sub-sciophilous lichen communities on rotting logs, occasionally on humus covered rocks and soil

- *Cladonion coniocraeae* Duvigneaud 1942 (2b)
- *Cladonion coniocraeae* Mattick 1951 (2b)
- *Cladonion coniocraeae* Laundon 1958 (2b)
- *Cladonion coniocraeae* Laundon 1967 (2b)
- *Cladonion coniocraeae* Hawksworth 1969 (2b)

CLE-04 *Brachythecietalia rutabulo-salebrosi* Marstaller 1987

Communities of hemerophilous weft- and mat-forming pleurocarpous mosses on nutrient-rich rotting wood at any stage of decay and on root flares in habitats with base-rich soil

CLE-04A *Bryo capillaris-Brachythecion rutabili* Lecointe 1975

Communities of hemerophilous weft- and mat-forming pleurocarpous mosses on nutrient-rich rotting wood at any stage of decay and on root flares in habitats with base-rich soil

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Appendix 3

Euro-VegChecklist 3 (EVC3): Conspectus of the high-rank syntaxa of the European vegetation dominated by algae.

For the abbreviations and citing conventions see the header of the Appendix 1.

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VEGETATION OF FRESHWATER ALGAE

CHA *Charetea intermediae* F. Fukarek 1961

Submerged macroalgal stonewort swards

cha01 The name *Charetea* in Fukarek (1961: 161) is explicitly based on the single order '*Charetalia* Sauer 1937'. The original diagnosis of the order containing only *Chara intermedia,* the name of the class can be completed with the specific epithet *'intermedia'* according to ICPN Rec. 10C. (HB, JPT)

- *Charetea* F. Fukarek 1961 (orig.form)
- *Charetea* F. Fukarek ex Krausch 1964 (29c)

cha02 Krausch (1964: 159) considered the '*Charetea* F. Fukarek 1961' erroneously as *nomen nudum* and described, superfluously, the new class *'Charetea'* based on the order '*Charetalia* Sauer 1937'. (HB)

- *Charetea fragilis* F. Fukarek ex Krausch 1964 (Rec.10C, 30)

cha03 Krause & Lang (1977) complemented the name '*Charetea* F. Fukarek ex Krausch 1964' with the epithet *'fragilis'* and in this form the name of the class has become established in literature. (HB)

- *Charetea globularis* F. Fukarek ex Krausch 1964 *nom. mut. propos.* (Rec.10C, 30, 45)

cha04 The illegitimate name '*Charetea fragilis* F. Fukarek ex Krausch 1964' is occasionally applied in the illegimitately mutated form '*Charetea globulosae* F. Fukarek ex Krausch 1964'. (HB)

- *Charo-Potametea* Kępczyński et Ceynowa-Gieldon 1972 p.p. (orig.form)

CHA-01 *Charetalia intermediae* Sauer 1937

Submerged macroalgal stonewort swards in neutral to alkaline and lime-rich waters

cha05 Sauer (1937: 432) published the name *'Charetalia'* validly with the single alliance *'Charion'*. As only *Chara intermedia* occurs in the original diagnosis of the alliance (see Remark *cha09*), it is possible to complete the name with the epithet according to ICPN Rec. 10C. (HB)

- *Charetalia* Sauer 1937 (orig.form)
- *Charetalia hispidae* Sauer 1937 (40a, *corr.illeg*.)

cha06 The name was complemented with the epithet '*hispidae'* (Krause & Lang 1977) and this name became then widely used in the literature. However, the completion is prohibited (ICPN art. 30) because *Chara hispida* does not occur in the original diagnosis of the order (see Remark *cha01*). (HB)

- *Charetalia fragilis* Sauer 1937 (40a, *corr.illeg*.)
- *Charetalia* Sauer ex Krausch 1964 (syntax.syn.)

cha07 Krausch (1964: 159) applied the name '*Charetalia* Sauer 1937' without the intention of describing a new order. Yet, the name became established as *Charetalia* Sauer ex Krausch 1964 instead of the validly published name '*Charetalia intermediae* Sauer 1937'. (HB)

- *Charetalia hispidae* Sauer ex Krausch 1964 (Rec.10C, 30)

cha08 As the *Charetalia* Sauer 1937, the *Charetalia* Sauer ex Krausch 1964 are frequently used with the epithet '*hispidae*' (e.g. Schaminée et al. 1995; Hrivnák et al. 2005; Iakushenko & Borysova 2012). (HB)

- *Lamprothamnietalia papulosi* Van Raam et Schaminée 1995 (3b)

CHA-01A *Charion intermediae* Sauer 1937

Perennial submerged macroalgal stonewort swards in neutral to alkaline waters

cha09 Sauer (1937: 432, 486) validly described the name *'Charion'*. The original diagnosis of the alliance contains

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only one validly published association named '*Macrocharacetum*'. In the relevés of the association *Chara intermedia* is the only species of the genus *Chara*. Therefore, it is possible to complete the name of the alliance with the specific epithet '*intermedia*' according to ICPN Rec. 10C. (HB, JPT)

- *Characion* Rübel 1933 (orig.form) (2b)
- *Charion* Sauer 1937 (orig.form)
- *Charion hispidae* Sauer 1937 (40a, *corr.illeg.*)

cha10 Krause & Lang (1977) proposed to add the epithet '*hispidae*'. The completion of the name is prohibited (ICPN art. 30) because *Chara hispida* does not occur in the original diagnosis of the order (see Remark *cha01*). (HB)

- *Charion fragilis* Krausch 1964 (syntax.syn.)

cha11 Krausch (1964) split the *Charion* of Sauer (1937) in a freshwater alliance, which he described as '*Charion fragilis* (Sauer 1937) *all. nov.*' (Krausch 1964: 159), and the *Charion canescentis* Krausch 1964 of brackish water. The former does not include the type of the '*Charion* Sauer 1937' and is a syntaxonomical synonym. (HB)

- *Limno-Charion* Krausch 1964 (3a)
- *Charion globularis* Krausch 1964 *nom. mut. propos.* (45)

cha12 The proposal for the name mutation was published by Šumberová et al. (2011: 257). (HB)

- *Charion asperae* W. Krause 1969 (syntax.syn.)
- *Eu-Charion asperae* W. Krause 1969 (orig.form) (corresp.; as suballiance)
- *Rhodo-Charion asperae* W. Krause 1969 (orig.form) (corresp.; as suballiance)
- *Charion contrario-asperae* Pietsch 1987 p.p. (5)
- *Charion rudis-hispidae* Pietsch 1987 (5)

CHA-01B *Charion vulgaris* (W. Krause et Lang 1977) W. Krause 1981

Ephemeral macroalgal stonewort swards in neutral to alkaline waters

cha13 Krause & Lang (1977) described the *Charion vulgaris* at the rank of a suballiance that was later up-ranked to the alliance level by Krause (1981). (HB)

- *Characion* Rübel 1933 (orig.form) (2b)
- *Charion vulgaris* W. Krause 1969 (phantom)
- *Thero-Charion asperae* W. Krause 1969 (orig.form) (corresp.; as suballiance)
- *Tolypellion* W. Krause 1969 (corresp.; as suballiance) (29c)
- *Charion contrario-aspersae* Pietsch 1987 p.p. (5)
- *Charion vulgaris* (W. Krause et Lang 1977) Van Raam et Schaminée in Schaminée et al. 1995 (31)

CHA-01C *Charion canescentis* Krausch 1964

Submerged macroalgal stonewort swards in brackish waters

cha14 Krausch (1964) was the first to classify the stonewort communities of brackish waters at the alliance level. Although Fukarek (1961) used the name '*Charion*' without authority and included associations of brackish water in the alliance, he referred explicitly in the text to the '*Charion* Sauer 1937' and '*Charetalia* Sauer 1937' (Fukarek 1961: 160-161). (HB, JPT)

- *Halo-Charion* Krausch 1964 (3a)

CHA-02 *Nitelletalia* W. Krause 1969

Submerged stonewort swards in acidic and lime-poor waters

- *Nitelletalia flexilis* W. Krause 1969 (Rec.10C, 30)

cha15 Krause (1969) described the name '*Nitelletalia* Krause 1969' without a specific epithet probably meaning the several *Nitella* species occurring in the original diagnosis. The name '*Nitelletalia flexilis* W. Krause 1969' became established since Krause & Lang (1977). (HB)

CHA-02A *Nitellion flexilis* W. Krause 1969

Atlantic-subatlantic submerged stonewort swards in acidic waters

- *Nitellion* Segal 1965 (2b, 3b)
- *Nitellion* Dąmbska 1966 (3b)
- *Nitellion flexilis* Dąmbska ex Schaminée et al. 1995 (31)

CHA-02B *Nitellion syncarpo-tenuissimae* W. Krause 1969

Submerged macroalgal stonewort swards in prealpine lakes with neutral to alkaline water

STI *Stigeoclonietea tenuis* Arendt 1982

Benthic macroalgal vegetation of eutrophic lowland waters dominated by green filamentous and yellow-green siphon algae

- *Cladophoretea glomeratae* Mériaux 1984 (phantom)
- *Cladophoretea* Bobrov et al. 2005 (3g)
- *Cladophoretea fractae* Korolyuk et Kipriyanova 2005 (3b, 5)
- *Cladophoretea glomeratae* Bobrov et al. 2007 (syntax.syn.)

STI-01 *Stigeoclonietalia tenuis* Arendt 1982

Benthic macroalgal vegetation of eutrophic lowland waters dominated by green filamentous and yellow-green siphon algae

- *Cladophoretalia glomeratae* Mériaux 1984 (phantom)
- *Cladophoretalia* Margalef 1960 (2b)
- *Cladophoretalia* Bobrov et al. 2005 (3g)
- *Cladophoretalia fractae* Korolyuk et Kipriyanova 2005 (3b, 5)
- *Cladophoretalia glomeratae* Bobrov et al. 2007 (syntax.syn.)

STI-01A *Cladophorion fractae* Margalef 1951

Benthic vegetation of macroscopic green filamentous and yellow-green siphon algae in stagnant eutrophic waters of lowland regions

- *Chlorophycion epilithicum limnobenticum* Symoens 1951 (2b, 2c)
- *Cladophorion fractae* Guerrero 1959 (2b)
- *Phormidion* Guerrero 1959 (2b)
- *Cladophorion glomeratae* Bohr 1962 (syntax.syn.)
- *Spirogyrion* Mériaux 1984 (phantom)

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- *Cladophorion* Korolyuk et Kipriyanova 2005 (3b, 5)
- *Cladophorion fractae* Bobrov et al. 2005 (31)

STI-01B *Stigeoclonion tenuis* Arendt 1982

Benthic vegetation of macroscopic green filamentous and yellow-green siphon algae in eutrophic currents of lowland regions

sti01 Arendt (1982) validly published the name *'Stigeoclonion tenuis'* although he listed the character species for the single association only and not for the alliance. The characteristic species of the association are then also characteristic species of the superior syntaxon (ICPN art. 8). (HB)

- *Chloro-Rhodophycion rheobenticum* Symoens 1951 p.p. (2b, 2c)
- *Cladophorion glomeratae* Möller et Pankow 1981 (2b)
- *Cladophorion glomeratae* Mériaux 1984 (phantom)
- *Vaucherio-Cladophorion glomeratae* Bobrov et al. 2005 (3g)
- *Vaucherio sessilis-Cladophorion glomeratae* Bobrov et al. 2007 (29c)

sti02 Bobrov et al. (2007) explicitly included the type of the *Stigeclonion tenuis* Arendt 1982 in the original diagnosis of the *Vaucherio sessilis-Cladophorion glomeratae* making the latter a superfluous name (ICPN art. 29c). (HB)

LEF *Lemaneetea fluviatilis* Weber-Oldecop ex Bobrov et Chemeris 2012

Submerged vegetation of macroscopic algal crusts and mats on hard substrates in fast flowing or turbulent freshwaters

lef01 The floristic composition suggests a close relationship of this unit with the lichen communities of the *Aspicilietea lacustris*. (HB)

- *Lemaneetea* Weber-Oldecop 1974 (2b)
- *Lemaneetea fluviatilis* Weber-Oldecop ex Täuscher 1998 (3f)

LEF-01 *Lemaneetalia fluviatilis* Weber-Oldecop ex Bobrov et Chemeris 2012

Submerged vegetation of macroscopic algal crusts and mats on hard substrates in fast flowing or turbulent freshwaters

- *Lemaneetalia* Weber-Oldecop 1974 (2b)
- *Lemaneetalia fluviatilis* Weber-Oldecop ex Täuscher 1998 (3f)

LEF-01A *Lemaneion fluviatilis* Weber-Oldecop ex Bobrov et Chemeris 2012

Submerged vegetation of macroscopic algal crusts and mats on hard substrates in fast-flowing and turbulent freshwater currents

- *Chloro-Rhodophycion rheobenticum* Symoens 1951 p.p. (2b, 2c)
- *Hildebrandio–Verrucarion rheobenticum* Symoens 1951 (orig.form) (2b)
- *Hildenbrandtio-Verrucarion* Symoens 1957 (orig.form) (2b)
- *Lemaneion* Weber-Oldecop 1974 (2b)
- *Lemaneion fluviatilis* Weber-Oldecop ex Täuscher 1998 (3f)

LEF-01B *Batrachospermion gelatinosi* Bobrov et Chemeris 2012

Submerged vegetation of macroscopic algal crusts and mats on hard substrates in moderately fast-flowing freshwater currents

- *Batrachospermion* Bobrov et Chemeris 2006 (3g)

NAV *Naviculetea gregariae* Täuscher in Bültmann et al. 2015

Benthic microalgal and cyanobacterial communities in fresh, brackish and salt waters

- *Naviculetea* Pankow 1980 (3b, 3g)
- *Naviculetea* Pankow ex Täuscher 1998 (2b, 3g)

NAV-01 *Naviculetalia gregariae* Täuscher in Bültmann et al. 2015

Benthic microalgal and cyanobacterial communities in fresh and brackish waters

- *Tribonemetalia* Margalef 1960 (2b)
- *Amphipleuretalia* Margalef 1960 (2b)
- *Euastretalia* Margalef 1960 (2b)
- *Naviculetalia* Pankow 1980 (3g)
- *Naviculetalia* Pankow ex Täuscher 1997 (2b, 3g)
- *Naviculetalia* Pankow ex Täuscher 1998 (3g)

NAV-01A *Oscillatorion limosae* Täuscher in Bültmann et al. 2015

Cyanobacterial mat-forming communities with diatoms in eutrophic and brackish lowland waters

- *Oscillatorion* Prát in Klika et Hadač 1944 (phantom)
- *Limoseto-Diatomeion* Fetzmann 1956 (2c, 3b)
- *Oscillatorion* Möller 1977 (1)
- *Oscillatorion* Möller et Pankow 1981 (2b)
- *Oscillatorion* Täuscher 1998 (2b)

NAV-01B *Melosirion variantis* Margalef 1951

Benthic diatom communities in eutrophic or brackish lowland waters

- *Bacillariophycion rheobenticum* Symoens 1951 (2b, 2c)
- *Diploneidion ellipticae* Margalef 1951 (syntax.syn.)
- *Meridio circularis-Naviculion gregariae* Schlüter 1961 (syntax.syn.)

NAV-01C *Cymbello-Synedrion capitatae* Schlüter 1961

Benthic diatom communities of eutrophic lowland ponds

nav01 According to Schlüter (1961), the syntaxonomic position of this alliance is only tentative. (HB)

NAV-01D *Tribonemion* Margalef 1951

Benthic microalgal communities in siderotrophic standing waterbodies

nav02 The syntaxonomic position of this alliance remains uncertain. (HB)

NAV-01E *Synedrion tabulatae* Margalef 1951

Benthic microalgal communities in oligohaline waters

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nav03 See Remark *nav02*. (HB)

- *Naviculion arenariae* Pankow 1980 (5)

nav04 The *Naviculion arenariae* was proposed by Pankow (1980) to accommodate benthic diatom communities of marine habitats. The classification of this unit in the *Synedrion tabulatae* Margalef 1951 remains uncertain. (HB)

NAV-01F *Achromation oxaliferi* Margalef 1951

Benthic microalgal communities in standing waterbodies enriched by hydrogen sulphide

nav05 See Remark *nav02*. (HB)

NAV-01G *Cymatopleurion elliptico-soleae* Margalef 1951

Benthic microalgal communities in very slow-flowing waters

nav06 See Remark *nav02*. (HB)

NAV-01H *Calothricion* Margalef 1951

Submerged microalgal biofilms on solid substrates in lime-rich waters

nav07 See Remark *nav02*. (HB)

NAV-01I *Diatomion hiemalis* Margalef 1950

Benthic diatom and other microalgal communities in oligotrophic mountain creeks and springs

nav08 See Remark *nav02*. (HB)

- *Hydruzion* Gams 1936 (2b)
- *Odontion hiemalis* Hadač et Fott in Klika et Hadač 1944 (orig.form) (2b)
- *Odontidion hiemalis* Hadač et Fott ex Klika 1948 (2b)
- *Bacillariophycion rheobenticum fontinale* Symoens 1951 (2b, 2c)
- *Diatomion hiemalis-mesodontis* Margalef 1951 (syntax. syn.)
- *Odontidion hiemalis* Hadač et Fott ex Hadač 1962 (2b)
- *Diatomo hiemalis-Ceratoneion arcis* Möller et Pankow 1981 (5)

NAV-01J *Hydrococcion rivularis-cesatii* Margalef 1951

Benthic microalgal communities on hard substrates in mountain creeks

nav09 See Remark *nav02*. (HB)

NAV-01K *Nostocion zetterstedtii* Margalef 1951

Microalgal biofilms on solid substrates in mountain freshwater lakes of Southern Europe

nav10 See Remark *nav02*. (HB)

NAV-01L *Euastrion* Margalef 1949

Benthic and planktic microalgal communities in dystrophic waters of high-altitude bog pools

nav11 See Remark *nav02*. (HB)

AST *Asterionelletea formosae* Täuscher 1998

Planktic microalgal communities in fresh, brackish and salt waters

- *Asterionelletea formosae* Täuscher 1981 (1)

ast01 In Täuscher (1981) the names of the class, order, and alliances were not effectively published, the publication being a thesis reproduced by hectography (ICPN art. 1). However, the name '*Asterionelletea formosae* Täuscher 1981' has been used in several later publications of Täuscher, but it has only been validly published by Täuscher (1998). (HB)

- *Asterionelletea formosae* Täuscher 1995 (2b)

AST-01 *Asterionelletalia formosae* Täuscher 1998

Planktic microalgal communities in fresh and brackish waters

- *Asterionelletalia formosae* Täuscher 1981 (1)
- *Asterionelletalia formosae* Täuscher 1995 (3f)

AST-01A *Asterionellion formosae* Möller et Pankow 1981

Planktic diatom and other microalgal communities in eutrophic freshwater or brackish lowland waters

ast02 The name *Asterionellion* was validly published in Möller & Pankow (1981: 321). Although no type was indicated, there is only one validly published association in the original diagnosis of the alliance. The original diagnosis of the alliance contains two associations, such as the '*Fragilario crotonensis-Asterionelletum formosae* (Messikommer 1927) Möller 1977' and the '*Melosiretum variantis* Budde 1930'. The former name corresponds to an illegitimate correction of the validly published name '*Fragilario crotonensis-Asterionelletum gracillimae* Messikommer 1927' (Messikommer 1927: 26–27; Möller & Pankow 1981: 304) to which the authors provided an unambiguous bibliographical reference. The name '*Melosiretum variantis* Budde 1930' was invalidly published in Budde (1930) (ICPN art. 2b). The three names (*Melosiretum variantis rivulare* Symoens 1951, *Melosiretum variantis fluviatile* Symoens 1951 and '*Diatometo vulgaris-Melosiretum variantis* Symoens 1954') included in the synonymy of the *Melosiretum variantis* were also invalidly published (art. 2b). Although Möller & Pankow (1981) did provide a table of relevés to document the association, they failed to designate the type. Therefore, the name *Melosiretum variantis* remained invalidly published. Consequently, there is only one sufficient element left in the original diagnosis of the alliance and the name *Asterionellion formosae* Möller et Pankow 1981 is validly published, with only *Asterionella formosa* being present in the relevés of Messikommer (1927). As Möller & Pankow (1981) retain the name *Asterionella formosa*, the name of the new alliance can be completed with the epithet '*formosae*' (ICPN Rec. 10C), although Messikommer (1927) used the synonym *A. gracillima*. (HB, JPT)

- *Bacillariophycion planctonicum oligo- et mesotrophicum* Symoens 1951 (2b, 2c)
- *Cyano-Bacillariophycion planctonicum eutrophicum* Symoens 1951 p.p. (2b, 2c)
- *Asterionellion formosae* Täuscher 1981 (1)
- *Asterionellion formosae* B. Möller et Pankow ex Täuscher 1998 (2b)

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AST-01B *Aphanizomeno floris-aquae-Microcystion aeruginosae* Täuscher 1995

Planktic cyanobacterial microalgal communities in eutrophic freshwater and brackish lowland waters

- *Cyano-Bacillariophycion planctonicum eutrophicum* Symoens 1951 p.p. (2b, 2c)
- *Aphanizomeno flos-aquae-Microcystion aeruginosae* Täuscher 1981 (1)

AST-01C *Pediastro duplicis-Scenedesmion quadricaudae* Täuscher in Bültmann et al. 2015

Planktic microalgal communities dominated by green algae in strongly eutrophic and brackish lowland waters

- *Pediastro-Scenedesmion* Täuscher 1981 (1)
- *Pediastro-Scenedesmion* Täuscher 1995 (2b, 3g)
- *Pediastro-Scenedesmion* Täuscher 1998 (2b, 3g)

VEGETATION OF SOIL ALGAE

BRH *Bracteacocco minoris-Hantzschietea amphioxyos* Khaybullina et al. 2005

Soil algae communities in the upper layer of disturbed chernozem and grey forest soil in the steppe and forest-steppe zones

brh01 The description of the class, orders, and alliances were published twice, in the Russian original and also in an English translation. The Russian text (Khaybullina et al. 2006) was printed later than the English translation (Khaybullina et al. 2005), the latter then becoming the effective publication of the names. (HB)

- *Bracteacocco-Hanzschietea* Khaybullina 2000 (3b)
- *Bracteacocco minoris-Hantzschietea amphioxyos* Khaybullina et al. 2006 (29c)

BRH-01 *Eustigmatetalia magni* Khaybullina et al. 2005

Communities of green and yellow-green algae in the upper layer of grey forest soil in (sub)urban environments in the forest-steppe zone

- *Cylindrospermetalia licheniformis* Khaybullina 2000 (3b)
- *Eustigmatetalia magni* Khaybullina et al. 2006 (29c)

BRH-01A *Chlamydomonado ellipticae-Desmotetrion stigmaticae* Sukhanova et Ishbirdin in Khabullina et al. 2005

Algae communities in the upper soil layer of deciduous forests, plantations, and synanthropic grasslands in urban environments in the forest-steppe zone

- *Chlamydomono-Chlorosarcinion stigmaticae* Sukhanova et Ishbirdin 1997 (3b)
- *Chlamydomonado ellipticae-Desmotetrion stigmaticae* Sukhanova et Ishbirdin in Khabullina et al. 2006 (29c)

BRH-01B *Naviculo nivalis-Phormidion dimorphi* Sukhanova et Ishbirdin in Khabullina et al. 2005

Algae communities in the upper layer of disturbed, compacted or contaminated acid or slightly saline soil in towns in the forest-steppe zone

- *Naviculo nivalis-Phormidion* Sukhanova et Ishbirdin 1997 (3b, 3g)
- *Naviculo nivalis-Phormidion dimorphi* Sukhanova et Ishbirdin in Khabullina et al. 2006 (29c)

BRH-02 *Phormidio interrupti-Oscillatorietalia amoenae* Khaybullina et al. 2005

Communities of filamentous cyanobacteria and diatoms in the upper layer of chernozem in (sub)urban environments in the steppe zone

- *Phormidio-Oscillatorietalia* Khaybullina 2000 (3b)
- *Phormidio interrupti-Oscillatorietalia amoenae* Khaybullina et al. 2006 (29c)

BRH-02A *Amphoro ovalis-Phormidion uncinati* Khaybullina et al. 2005

Algae communities in the upper layers of disturbed, compacted and salinized soils in urban environments in the steppe zone

- *Chroococcion humicoli* Hadač in Klika 1948 p.p. (2b)
- *Amphoro-Phormidion* Khaybullina 2000 (3b, 3g)
- *Amphoro ovalis-Phormidion uncinati* Khaybullina et al. 2004 (5)
- *Amphoro ovalis-Phormidion uncinati* Khaybullina et al. 2006 (29c)

BRH-02B *Klebsormidio flaccidi-Myrmecion biatorellae* Khaybullina et al. 2005

Algae communities in the upper layers of slightly shaded chernozem soils in anthropogenic grasslands and parks in the steppe zone

- *Klebsormidio-Myrmecion biatorellae* Khaybullina 2000 (3b)
- *Klebsormidio flaccidi-Myrmecion biatorellae* Khaybullina 2005 (5)
- *Klebsormidio flaccidi-Myrmecion biatorellae* Khaybullina et al. 2006 (29c)

AEROPHYTIC ALGAL VEGETATION

GLO *Gloeocapsetea sanguineae* Bültmann et Golubić in Bültmann et al. 2015

Vegetation of aerophytic microalgal films on calcareous rocks

GLO-01 *Gloeocapsetalia sanguineae* Bültmann et Golubić in Bültmann et al. 2015

Vegetation of aerophytic microalgal films on calcareous rocks

GLO-01A *Gloeocapsion sanguineae* Golubić 1967

Vegetation of aerophytic microalgal films on calcareous rocks

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- *Gleocapsion sanguinea* Hadač in Klika et Hadač 1944 (orig.form) (2b, 3b)
- *Gleocapsion sanguineae* Hadač ex Hadač in Klika 1948 (orig.form) (2b)

DES *Desmococcetea olivacei* Bültmann in Bültmann et al. 2015

Microalgal vegetation of aerophytic green algae on acidic substrates

DES-01 *Desmococcetalia olivacei* Bültmann in Bültmann et al. 2015

Microalgal vegetation of aerophytic green algae on acidic substrates

DES-01A *Desmococcion olivacei* Bültmann in Bültmann et al. 2015

Microalgal vegetation of aerophytic green algae on acidic substrates

des01 The syntaxa are described from bark. The algal vegetation on acidic rock surfaces is syntaxonomically unexplored. (HB)

- *Schizogonion cruenti* Ochsner 1928 (2b)

des02 The protologue of this alliance contains only invalidly published associations (*nomina nuda*; ICPN art. 2b), hence the name of the alliance also remains invalidly published. Although the name has been used in later publications (e.g. Felföldy 1941; Klika 1948), it has not been validated. (HB)

- *Schizogonion cruenti* Ochsner in Klika et Hadač 1944 (2b)

VEGETATION OF SNOW AND ICE ALGAE

MES *Mesotaenietea berggrenii* Bültmann et Takeuchi in Bültmann et al. 2015

Cryophytic algae in and on the surface of (semi)permanent snow and ice in the alpine or polar regions

MES-01 *Mesotaenietalia berggrenii* Bültmann et Takeuchi in Bültmann et al. 2015

Cryophytic algae in and on the surface of (semi)permanent snow and ice in the alpine or polar regions

MES-01A *Mesotaenion berggrenii* Bültmann et Takeuchi in Bültmann et al. 2015

Cryophytic algae in and on the surface of (semi)permanent snow and ice in the alpine or polar regions

- *Sphaerellion nivalis* Hadač in Klika et Hadač 1944 (2b)
- *Sphaerellion nivalis* Hadač ex Klika 1948 (2b)
- *Sphaerellion nivalis* Hadač ex Hadač 1962 (2b)

VEGETATION OF MARINE ALGAE

ENT *Entophysalidetea deustae* Giaccone in Bültmann et al. 2015

Photophytic marine macro- and microalgal communities on hard substrates in the supra- and eulittoral zones of seashores

- *Chthamaletea* Giaccone 1965 (2c)
- *Melarphetea neritoidis* Giaccone 1965 p.p. (2c)
- *Dictyoto dichotomae-Laurencietea pinnatifidae* Julve 1992 p.p. (5)
- *Peyssonnelio dubyi-Lithophylletea incrustantis* Julve 1992 (2b)
- *Entophysalidetea deustae* Giaccone in Giaccone et al. 1993 (5)

ent01 Giaccone et al. (1993) typified this class *expressis verbis* with an association instead of an order, i.e. a syntaxon of the next subordinate principal rank as required by ICPN art. 17. (HB)

- *Fucetea* Golub et al. 2003 (2b, 5)
- *Dictyoto dichotomae-Osmundeetea pinnatifidae* Julve ex Julve et Manneville 2006 p.p. (3i)

ent02 The name '*Dictyoto dichotomae-Laurencietea pinnatifidae* Julve 1992' was mutated to the *Dictyoto dichotomae-Osmundeetea pinnatifidae* by Julve & Manneville (2006). (HB)

ENT-01 *Pleurocapsetalia gloeocapsoidis* Ercegović 1932

Marine cyanobacterial communities on hard substrates in the supralittoral zone of the Mediterranean Sea and the Atlantic Ocean

- *Pleurocapsetalia crepidinum* Ercegovic 1932 *nom. mut. propos.* (45)

ent03 Frémy (1933–1936: 278) changed the name *Pleurocapsetalia gloeocapsoidis* Ercegović 1932 to *Pleurocapsetalia crepidinum* Ercegović 1932, however maintaining the name of the characteristic species of Ercegović (1932), *Pleurocapsa gloeocapsoides* Setchell & N.L. Gardner, without giving a reason. At that time *Pleurocapsa gloeocapsoides* was considered a synonym of *Gloeocapsa crepidinum* (Thuret) Thuret (syn. *Pleurocapsa crepidinum* (Thuret) Ercegović) (Geitler 1932). Nowadays *Myxosarcina gloeocapsoides* (Setchell & N.L. Gardner) Komárek & Anagnostidis and *Gloeocapsopsis crepidinum* (Thuret) Geitler ex Komárek are considered as separate species. (HB)

- *Entophysalidetalia deustae* Ercegović 1932 *nom. mut. propos.* (45)

ent04 Giaccone et al. (1993) considered *Gloeocapsa crepidinum* (Thuret) Thuret and *Pleurocapsa gloeocapsoides* Setchell & N.L.Gardner as synonyms of *Entophysalis deusta* (Meneghini) F.E. Drouet & W.A. Daily and proposed to mutate the name of the syntaxon. However in many floras these species are still listed as separate entities and therefore we maintain the original name. (HB)

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• *Microcoleetalia chthonoplastis* Golubić 1963 (1)

ent05 This syntaxon comprising marine cyanobacterial mats from upper eulittoral and supralittoral of polluted parts of Mediterranean rocky seashores (e.g. harbours) was described in a thesis (Golubić 1963). The order includes the alliances *Lyngbyon confervoidis* Golubić 1963 and *Spirulinion subtilissimae* Golubić 1963. Other communities of *Coleofasciculus chthonoplastes* (Thuret ex Gomont) M. Siegesmund, J.R. Johansen & T. Friedl and *Lyngbya aestuarii* Liebman ex Gomont are known from the saltmarshes of the North Sea (Fogg et al. 1973, Nienhuis 1987) and probably belong in the *Naviculetea*. (HB)

• *Melarphetalia neritoidis* Giaccone 1965 (2c)

ENT-01A *Scopulonemion hansgirgiani* Ercegović 1932

Marine epilithic cyanobacterial communities on calcareous hard substrates in sheltered habitats in the supralittoral zone of the Mediterranean Sea

• *Entophysalidion deustae* Ercegović 1932 *nom. mut. propos.* (45)

ent06 Assuming that *Scopulonema hansgirgianum* Ercegović and *Entophysalis deusta* (Meneghini) F.E. Drouet & W.A. Daily are synonyms, Giaccone et al. (1993: 252–253) proposed to mutate the name *'Entophysalidion deustae'* to *'Scopulonemion hansgirgiani'*. However the synonymy not being universally accepted, we maintain the original name. (HB)

• *Melarphetalion neritoidis* Giaccone 1965 (2c)

ENT-01B *Hormathonemion violaceonigri* Ercegović 1932

Marine partly endolithic cyanobacterial communities on calcareous hard substrates in exposed habitats in the supralittoral zone of the Mediterranean Sea

ENT-01C *Ulothricio-Bangion fuscopurpureae* Den Hartog 1959

Photophytic marine cyanobacterial and macroalgal communities on eutrophic hard substrates in the supralittoral zone of the Atlantic Ocean and the Mediterranean Sea

ent07 Julve (1992) classified the *Ulothricio subflaccidae-Bangion fuscopurpureae* Den Hartog 1959 in the *Ulvetalia lactucae*. (HB)

• *Ulothricio subflaccidae-Bangion fuscopurpureae* Den Hartog 1959 (40a, *corr.illeg.*)

• *Lyngbyon confervoidis* Golubić 1963 (1)

ent08 see Remark *ent05*. (HB)

• *Spirulinion subtilissimae* Golubić 1963 (1)

ent09 see Remark *ent05*. (HB)

ENT-02 *Bangietalia atropurpureae* Giaccone in Giaccone et al. 1993

Photophytic marine macroalgal communities on hard substrates in the upper eulittoral zone of the Mediterranean Sea

• *Chthamaletalia* Molinier 1958 (1)

• *Chthamaletalia* Molinier 1960 (2c)

ENT-02A *Porphyrion leucostictae* Julve 1992

Photophytic marine macroalgal communities on hard substrates in the upper and middle eulittoral level of the Mediterranean Sea

• *Nemalio helminthoidis-Rissoellion verruculosae* Julve 1992 (2b)

• *Bangion atropurpureae* Giaccone in Giaccone et al. 1993 (syntax.syn.)

ENT-03 *Neogoniolitho notarisii-Nemodermetalia tingitani* Molinier 1960

Photophytic marine macroalgal communities on hard substrates in the lower eulittoral zone of the Mediterranean Sea

• *Neogoniolitho notarisii-Nemodermetalia tingitani* Molinier 1958 (1)

ent10 In most publications the syntaxa of Molinier are dated 1958, which seems to refer to an unpublished manuscript. Molinier himself dates the syntaxa with 1958 in the effective publication, which is Molinier (1960). (HB)

• *Acrochaetietalia mediterranei* Boudouresque 1967 (1)

• *Acrochaetietalia* Boudouresque 1971 (29c)

ent11 Boudouresque (1971) suggested to merge the *Neogoniolitho-Nemodermetalia* and the *Chthamaletalia nom. inval.* of Molinier (1960) under a new name – the *Acrochaetietalia*. The *Neogoniolitho-Nemodermetalia* is validly published and therefore the new name *Acrochaetietalia* is a *nomen superfluum* (ICPN art. 29c). (HB)

• *Ralfsietalia verrucosae* Giaccone in Giaccone et al. 1993 (syntax.syn.)

ent12 Giaccone et al. (1993) rejected the *Neogoniolitho-Nemodermetalia* of Molinier (1960) as dubious and described a new order, the *Ralfsietalia verrucosae*, a step that we have not adopted. (HB)

• *Peyssonnelio dubyi-Lithophylletalia incrustantis* Julve et Manneville 2006 (2b)

ENT-03A *Neogoniolitho notarisii-Nemodermion tingitani* Molinier 1960

Photophytic marine macroalgal communities on hard substrates in the lower eulittoral zone of the Mediterranean Sea

• *Neogoniolitho notarisii-Nemodermion tingitani* Molinier 1958 (1)

• *Ralfsion verrucosae* Giaccone in Giaccone et al. 1993 (syntax.syn.)

ent13 Giaccone et al. (1993) considered both associations in the original diagnosis of the *Neogoniolitho-Nemodermion* Molinier 1960 as dubious and rejected the alliance. For this reason they described the *Ralfsion verrucosae*. We do not share that opinion and accept the *Neogoniolitho-Nemodermion*. (HB)

• *Lithophyllion incrustantis* Julve et Manneville 2006 (2b)

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ENT-04 *Fucetalia vesiculosi* Julve in Bültmann et al. 2015

Photophytic marine macroalgal communities on hard substrates in the eulittoral zone of the Atlantic Ocean

- *Fucetalia* Hadač in Klika 1948 (2b)
- *Fucetalia vesiculosi* Julve 1992 (2b)
- *Fucetalia* Golub et al. 2003 (2b, 5)
- *Ascophyllo nodosi-Fucetalia serrati* Julve et Manneville 2006 (3i)

ENT-04A *Ascophyllion nodosi* Julve in Bültmann et al. 2015

Photophytic marine macroalgal communities on hard substrates in the upper eulittoral zone of the Atlantic Ocean

- *Dictyosiphonion foeniculacei* Du Rietz 1941 (2b)
- *Dictyosiphonion* Du Rietz ex Klika 1948 (2b)
- *Pelvetion canaliculatae* Hadač in Klika 1948 (2b)
- *Fucion* Golub et al. 2003 (2b, 5)
- *Ascophyllion nodosi* Julve et Manneville 2006 (5)

ENT-04B *Fucion serrati* Julve et Manneville 2006

Photophytic marine macroalgal communities on hard substrates in the lower eulittoral zone of the Atlantic Ocean

ent14 Julve & Manneville (2006) have not selected a type, but they included in the alliance together with seven invalid associations the validly published *Fucetum serrati* den Hartog 1959 as the only element suitable to be considered as the type (ICPN ICPN art. 5). (HB)

- *Furcellarion* Du Rietz 1941 (2b)
- *Fucion inflati* Hadač in Klika 1948 (2b)
- *Furcellarion* Du Rietz ex Klika 1948 (2b)
- *Gymnogongro griffithsiae-Gelidion crinalis* Julve 1992 (2b)

ENT-05 *Dalmatelletalia polyformis* Ercegović 1932

Partly endolithic cyanobacterial communities in the low supralittoral zone on calcareous rocks of Eastern Mediterranean seashores

ent15 Some of the characteristic species are also known from Atlantic coasts and it is possible that the order has a wider distribution area than currently known. To our knowledge the name has not been typified yet and we do it here. *Lectotypus hoc loco*: *Solention foveolarum* Ercegović 1932 (Ercegović 1932: 190, 196–200). (HB)

ENT-05A *Entophysalidion granulosae* Ercegović 1932

Partly endolithic cyanobacterial communities in the low supralittoral zone on flat flysch and dolomite rocks of Eastern Mediterranean seashores

ENT-05B *Solention foveolarum* Ercegović 1932

Partly endolithic cyanobacterial communities in the low supralittoral zone on dissected karstic rocks of Eastern Mediterranean seashores

ENT-06 *Hyelletalia caespitosae* Ercegović 1932

Endolithic cyanobacterial communities in the upper eulittoral zone mostly on calcareous rocks along Adriatic and Mediterranean seashores

ent16 See Remark *ent15*. To our knowledge the name has not been typified yet and we do it here. *Lectotypus hoc loco*: *Mastigocoleion testarum* Ercegović 1932 (Ercegović 1932: 190–194). (HB)

ENT-06A *Mastigocoleion testarum* Ercegović 1932

Endolithic cyanobacterial communities in the upper eulittoral zone on coastal flysch and other subacidic rocky substrates along Adriatic and Mediterranean seashores

ENT-06B *Solention achromaticae* Ercegović 1932

Endolithic cyanobacterial communities in the upper eulittoral zone on karstic rocks along Adriatic and Mediterranean seashores

CYS *Cystoseiretea* Giaccone 1965

Photophytic marine macroalgal communities on hard substrates in the infralittoral and circalittoral zones of Atlantic and Mediterranean seashores

cys01 Though Giaccone (1965: 34) used a syntaxonomical scheme without author names, he adopted the syntaxonomical scheme of Molinier (1960) with the bibliographical error of citing the work as 1959 (Giaccone 1965: 32). Modifications to the scheme of Molinier are attributed to the author (Giaccone 1965: 33). Thus of the *Cystoseiretea*, *Cystoseiretalia* and *Cystoseirion*, the latter two can be attributed to Molinier (1960), while the class is described by Giaccone (1965). (HB)

- *Cystoseiretea crinitae* Giaccone 1965 (40a, *corr.illeg.*)
- *Dictyoto dichotomae-Laurencietea pinnatifidae* Julve 1992 p.p. (5)
- *Ulvetea lactucae* Julve 1992 (syntax.syn.)

cys02 Julve (1992) described the class, with one order – the '*Ulvetalia lactucae* Molinier 1958', but cited in the reference list Molinier (1960). See Remark *ent10*. Because there is only this one publication by Molinier in the bliographic list, the syntaxa ascribed to Molinier 1958 can be unambiguously attributed to Molinier (1960). The decision to accept Molinier (1960) as the citation for a syntaxon name with a reference to Molinier 1958 however is not undisputed (see Theurillat & Moravec 1995). (HB)

- *Dictyoto dichotomae-Osmundeetea pinnatifidae* Julve ex Julve et Manneville 2006 p.p. (3i)

CYS-01 *Cystoseiretalia* Molinier 1960

Photophytic marine macroalgal communities on hard substrates in the infralittoral and circalittoral zones along Mediterranean seashores

- *Cystoseiretalia* Molinier 1958 (1)
- *Cystoseiretalia crinitae* Molinier 1960 (40a, *corr.illeg.*)
- *Cystoseiretalia* Boudouresque 1971 (29c)

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CYS-01A *Cystoseirion crinitae* Molinier 1960

Strongly photophytic marine macroalgal communities on hard substrates in the infralittoral and circalittoral zones along Mediterranean seashores

cys03 Molinier (1960) frequently used the name *Cystoseirion* without an epithet. However, it can be seen on p. 227 that he instated the alliance *Cystoseirion crinitae* with, in addition, a tentative name *Cystoseirion strictae* (ICPN art. 3b). (HB)

- *Cystoseirion crinitae* Molinier 1958 (1)
- *Cystoseirion strictae* Molinier 1960 (3b)

cys04 See Remark *cys03.* (HB)

- *Sargassion vulgaris* Giaccone 1972 (syntax.syn.)
- *Sargassion vulgaris* Giaccone in Giaccone et Bruni 1973 (31)
- *Kuckuckio spinosae-Giraudyon sphacelarioides* Julve 1992 (2b)

CYS-01B *Sargassion hornschuchii* Giaccone 1972

Moderately photophytic marine macroalgal communities on hard substrates in the infralittoral and circalittoral zones along Mediterranean seashores

- *Sargassion hornschuchii* Giaccone in Giaccone et Bruni 1973 (31)

CYS-02 *Laminarietalia hyperboreae* Julve 1992

Photophytic marine macroalgal communities on hard substrates in the infralittoral zone along Atlantic Ocean seashores

CYS-02A *Laminarion saccharinae* Julve 1992

Photophytic marine macroalgal communities on hard substrates in sheltered habitats of the infralittoral zones along Atlantic Ocean shores

- *Laminarion saccharinae* Hadač in Klika 1948 (2b)

CYS-02B *Laminarion hyperboreae* Julve in Bültmann et al. 2015

Photophytic marine macroalgal communities on hard substrates in the infralittoral zone under strong surf along Atlantic Ocean shores

- *Cystoseirion tamariscifoliae* Julve 1992 (2b)
- *Cystoseirion baccatae* Julve 1992 (2b)

CYS-03 *Ulvetalia lactucae* Molinier 1960

Photophytic marine macroalgal communities on nutrient-enriched hard substrates in the (eu-) infralittoral and circalittoral zones along the Mediterranean Sea and Atlantic Ocean shores

- *Ulvetalia* Berner 1931 (phantom)
- *Enteromorphetalia* Hadač in Klika 1948 (2b)
- *Ulvetalia lactucae* Molinier 1958 (1)
- *Ulvetalia* Molinier 1960 (orig.form)

cys05 Molinier (1960: 232) described the name *'Ulvetalia'* with only one species of *Ulva* in the original diagnosis. Therefore, it is possible to complete the name of the order with the species epithet of *Ulva lactuca* L. according to ICPN Rec. 10C. (HB)

CYS-03A *Ulvo lactucae-Corallinion mediterraneae* Vignes ex Julve 1992

Photophytic marine macroalgal communities on nutrient-enriched hard substrates exposed to wave action in the (eu-) infra- and circalittoral zones of the Mediterranean Sea

cys06 Julve (1992) did not designate a type, but listed only two associations, one not effectively published (hence not suitable to serve as a type), and a valid one (*'Pterocladio pinnatae-Ulvetum lactucae* Molinier 58; for Molinier 1958 and 1960 see Remark *cys02*), becoming the type. (HB)

- *Ulvo-Corallinion mediterraneae* Vignes in Molinier et Vignes 1971 (3b)
- *Pterothamnio plumulae-Compsothamnion thuyoidis* Julve in Julve et Manneville 2006 (2b)

cys07 The name was ascribed by Julve & Manneville (2006) to 'Julve 2004', however without further information about that source. It is provisionally placed here. (HB)

CYS-03B *Ulvion rigidae* Berner 1931 *corr.* Giaccone et al. 1994

Photophytic marine macroalgal communities on nutrient-enriched, sheltered hard substrates of the lower eulittoral zone of the shores of the Mediterranean Sea and the Atlantic Ocean

cys08 In Berner (1931) *Ulva lactuca* L. is the only *Ulva* species in the original diagnosis of the name *'Ulvion'* described from the Mediterranean Sea. Boudouresque et al. (1977) proposed to correct the name of one of the associations, the *Ulvetum lactucae* Berner 1931, to *Ulvetum rigidae*, because *Ulva rigida* C. Agardh is the most common species in that habitat in the Mediterranean. Giaccone et al. (1994a: 139, 141) applied the correction also to the names of higher syntaxa. *Ulva lactuca* is excluded from the Mediterranean Sea in recent monographs (e.g. Cormaci et al. 2014). (HB)

- *Ulvion* Berner 1931 (orig.form)
- *Ulvion lactucae* Berner 1931 (Rec. 10C)

cys09 Berner (1931: 46) described the name *'Ulvion'* with only one *Ulva* species in the original diagnosis and the name can be completed with the species epithet of *Ulva lactuca* L. according to ICPN Rec. 10C. (HB)

- *Ulvion laetevirentis* Berner 1931 *nom. mut. propos.* (45)

cys10 The name *'Ulvion rigidae'* was later mutated to *'Ulvion laetevirentis'* (e.g. in Giaccone & Di Martino 2000) assuming synonymy of *Ulva rigida* C. Agardh and *U. laetevirens* Areschoug. However nowadays the taxa are separated on species level again (e.g. Cormaci et al. 2014). (HB)

- *Enteromorphion intestinalis* Hadač in Klika 1948 (2b)
- *Enteromorphion intestinalis* Hadač ex Kornaś et al. 1960 (syntax.syn.)
- *Ulvion rigidae* Vignes in Molinier et Vignes 1971 (3b)

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LIS *Lithophylletea soluti* Giaccone 1965

Sciophilous marine macroalgal communities on hard substrates in the infralittoral and circalittoral zones of Mediterranean and Atlantic Ocean shores

lis01 The name *'Lithophylletea'* was published without an epithet by Giaccone (1965). As *Lithophyllum solutum* (Foslie) Me. Lemoine is the only *Lithophyllum* species occurring in the original diagnosis the name can be completed according to ICPN Rec. 10C. (HB)

- *Lithophylletea* Giaccone 1965 (orig.form)
- *Apoglosso ruscifolii-Hypoglossetea woodwardii* Julve 1992 (3f)
- *Apoglosso ruscifolii-Hypoglossetea hypoglossoidis* Julve ex Julve et Manneville 2006 (2b)

LIS-01 *Rhodymenietalia ardissonei* Augier et Boudouresque 1975

Sciophilous marine macroalgal communities on hard substrates in the infralittoral zone along Mediterranean seashores

- *Rhodymenietalia ardissonei* Boudouresque 1967 (1)
- *Rhodymenietalia ardissonei* Boudouresque 1971 (2b)
- *Rhodymenietalia ardissonei* Boudouresque ex Julve 1992 (31)
- *Rhodymenietalia ardissonei* Boudouresque ex Giaccone 1994 (29c)

LIS-01A *Petroglossion nicaensis* Boudouresque et Cinelli 1971

Sciophilous marine macroalgal communities on hard substrates in the infralittoral zone in habitats with multi-directional water movement along Mediterranean seashores

- *Schotterion nicaeensis* Boudouresque et Cinelli 1971 *nom. mut propos.* (45)

LIS-01B *Peyssonnelion* Augier et Boudouresque 1975

Sciophilous marine macroalgal communities on hard substrates in the infralittoral zone with one-directional water movement or in sheltered sites along Mediterranean seashores

- *Peyssonnelion squamariae* Augier et Boudouresque 1975 (Rec.10C, 30)
- *Udoteo petiolatae-Halimedion tunae* Julve 1992 (5)

LIS-02 *Lithophylletalia soluti* Giaccone 1965

Sciophilous marine macroalgal communities on mobile hard substrates such as pebble beds in the circalittoral zone along Mediterranean seashores

lis02 See Remark *lis01.* (HB)

- *Lithophylletalia* Giaccone 1965 (orig.form)

LIS-02A *Lithophyllion soluti* Giaccone 1965

Sciophilous marine macroalgal communities on mobile hard substrates such as pebble beds in the circalittoral zone along Mediterranean seashores

lis03 See Remark *lis01.* (HB)

- *Lithophyllion* Giaccone 1965 (orig.form)
- *Lithophyllion grandiusculi* Giaccone 1965 (Rec.10C, 29)

lis04 Giaccone et al. (1994b: 217) added the epithet *'grandiusculum'* to complete the name *Lithophyllion* Giaccone 1965. Though *Lithophyllum grandiusculum* (Montagne) Woelkerling, Penrose & Y.M. Chamberlain (now *L. stictaeforme* (Areschoug) Hauck) occurs as a synonym under the name *Pseudolithophyllum expansum* (Philippi) Me.Lemoine in the original diagnosis of the name *'Lithophyllion'* (Giaccone 1965), such a correction is not in accordance with ICPN Art. 29. (See Remark *lis01.*) (HB)

- *Lithophyllion stictaeformis* Giaccone 1965 (Rec.10C, 29)

lis05 Giaccone (2007: 132) mutated the illegitimate name *'Lithophyllion grandiusculi'* because *Lithophyllum stictaeforme* (Areschoug) Hauck is the current name for *L. grandiusculum* (Montagne) Woelkerling, Penrose & Y.M. Chamberlain and *Pseudolithophyllum expansum* (Philippi) Me.Lemoine. (HB)

- *Dasyopsidion plano-spinellae* Julve 1992 (5)

LIS-03 *Delesserietalia sanguinei* Julve in Bültmann et al. 2015

Sciophilous marine macroalgal communities on hard substrates mostly in the infralittoral and circalittoral zones along Atlantic Ocean shores

- *Delesserietalia sanguinei* Julve 1992 (2b)

LIS-03A *Delesserion sanguineae* Julve in Bültmann et al. 2015

Sciophilous marine macroalgal communities on hard substrates mostly in the infralittoral and circalittoral zones along Atlantic Ocean shores

- *Polysiphonion arcticae* Hadač in Klika 1948 (2b)
- *Delesserion sanguineae* Julve et Manneville 2006 (2b)

CAU *Caulerpetea racemosae* Giaccone et Di Martino in Bültmann et al. 2015

Marine macroalgal communities on soft substrates in the infralittoral and circalittoral zones along Mediterranean seashores

- *Caulerpetea* Giaccone et Di Martino 1997 (3g)

CAU-01 *Caulerpetalia racemosae* Giaccone et Di Martino in Bültmann et al. 2015

Marine macroalgal communities on soft substrates in the infralittoral and circalittoral zones along Mediterranean seashores

- *Caulerpetalia* Giaccone et Di Martino 1997 (3g)

CAU-01A *Caulerpion racemosae* Giaccone et Di Martino in Bültmann et al. 2015

Marine macroalgal communities on soft substrates in the infralittoral and circalittoral zones along Mediterranean seashores

- *Caulerpion* Giaccone et Di Martino 1997 (3g)

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Appendix 4

New syntaxa described, validated and typified in this paper.

This Appendix features the names of all syntaxa that have described as new (this paper contains their protologues) or have been validated according to the rules of the ICPN (Weber et al. 2000). We also list protologues of new associations that had to be either described or validated in order to allow validation of high-rank syntaxa. Finally, we also present a list of new syntaxonomic concepts that have not yet been published (also not in this paper). Their formal description will be performed elsewhere. For convenience we also provide a list of formal (*hoc loco*) typifications of syntaxa described earlier. This Appendix was compiled by L. Mucina and H. Bültmann

New and validated high-rank syntaxa

Classes

Digitario sanguinalis-Eragrostietea minoris Mucina, Lososová et Šilc in Mucina et al. 2016
Posidonietea oceanicae Den Hartog ex Mucina in Mucina et al. 2016
Saxifrago cernuae-Cochlearietea groenlandicae Mucina et Daniëls in Mucina et al. 2016
Violetea cheiranthifoliae Voggenreiter ex Mucina in Mucina et al. 2016

Orders

Berberido creticae-Juniperetalia excelsae Mucina in Mucina et al. 2016
Hackelio deflexae-Blitetalia foliosi Mucina in Mucina et al. 2016
Hyperico empetrifolii-Genistetalia acanthocladae Mucina in Mucina et al. 2016
Lavandulo stoechadis-Hypericetalia olympici Mucina in Mucina et al. 2016
Posidonietalia oceanicae Den Hartog ex Mucina in Mucina et al. 2016
Rhododendro caucasici-Betuletalia litwinowii Mucina in Mucina et al. 2016
Salicetalia glauco-lanatae Boeuf et al. ex Mucina et Daniëls in Mucina et al. 2016
Senecioni rupestris-Rumicetalia alpini Mucina et Karrer in Mucina et al. 2016
Spartio juncei-Cytisetalia scoparii Mucina in Mucina et al. 2016
Tanaceto achilleifolii-Stipetalia lessingianae Lysenko et Mucina in Mucina et al. 2016
Violetalia cheiranthifoliae Hohenester et Welβ ex Mucina in Mucina et al. 2016

Alliances

*Asparago orientalis-Juniperion macrocarpae (*Díez-Garretas et Asensi 2013) Mucina in Mucina et al. 2016
Berberido aetnensis-Pinion laricionis (S. Brullo et al. 2001) Mucina et Theurillat in Mucina et al. 2016
Brachypodio pinnati-Juniperion communis Mucina in Mucina et al. 2016
Campanulo sibiricae-Pinion brutiae Litvinskaya et Postarnak ex Mucina in Mucina et al. 2016
Cymodoceion nodosae Den Hartog ex Mucina in Mucina et al. 2016
Daphno blagayanae-Genistion radiatae Ranđelović, Rexhepi et Jovanović ex Mucina et Theurillat in Mucina et al. 2016
Elytrigio bessarabicae-Lactucion tataricae Korzhenevskii ex Didukh et Mucina in Mucina et al. 2016
Erico carneae-Piceion omorikae Mucina et Čarni in Mucina et al. 2016
Erico scopariae-Cytision scoparii Mucina in Mucina et al. 2016
Odontarrheno euboeae-Lavandulion stoechadis Mucina in Mucina et al. 2016
Helichryso barrelieri-Centaureion spinosae Mucina et Dimopoulos in Mucina et al. 2016
Limonion anfracti-cancellati (Horvatić 1934) Mucina in Mucina et al. 2016
Lycio europaei-Ipomoeion purpureae O. de Bolòs ex Mucina in Mucina et al. 2016
Nanozosterion noltii Den Hartog ex Mucina in Mucina et al. 2016
Origano syriaci-Hypericion thymifolii Mucina et Theurillat in Mucina et al. 2016
Ornithogalo corsici-Trifolion subterranei (Farris et al. 2013) Mucina in Mucina et al. 2016
Phlomido fruticosae-Euphorbion dendroidis Mucina et Dimopoulos in Mucina et al. 2016
Phlomido lychnitidis-Brachypodion retusi Mateo ex Theurillat et Mucina in Mucina et al. 2016
Ranunculo-Poion alpinae Gjaerevoll ex Daniëls in Mucina et al. 2016
Rhododendrion myrtifolium de Foucault ex Theurillat et Mucina in Mucina et al. 2016
Romuleo-Saginion (Wolff 1968) Mucina in Mucina et al. 2016
Salicion callicarpeae Daniëls in Mucina et al. 2016
Saxifragion cotyledonis Nordhagen ex Mucina et Chytrý in Mucina et al. 2016
Seslerio rigidae-Pinion Coldea ex Mucina et Čarni in Mucina et al. 2016

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Sileno thymifoliae-Jurineion kilaeae Géhu et Uslu ex Mucina in Mucina et al. 2016
Tamo communis-Viburnion lantanae (Géhu et al. 1983) Mucina in Mucina et al. 2016
Tanaceto achilleifolii-Stipion lessingianae Royer ex Lysenko et Mucina in Mucina et al. 2016
Violo messanensis-Adenocarpion intermedii Mucina in Mucina et al. 2016

New and validated associations

Crithmo-Elytrigietum bessarabicae Korzhenevskii ex Mucina et Didukh in Mucina et al. 2016
Fumano pinatzii-Lavanduletum stoechadis Mucina et Dimopoulos in Mucina et al. 2016
Ranunculo acris-Poetum alpinae Daniëls in Mucina et al. 2016
Tanaceto achilleifolii-Stipetum lessingianae Lysenko et Kalmykova in Mucina et al. 2016

Unpublished syntaxonomic concepts used in this paper

Orders
Arabido alpinae-Petasitetalia paradoxi Mucina et Valachovič *ined.*
Elytrigio repentis-Dittrichietalia viscosi Mucina *ined.*
Gentianello columnae-Festucetalia italicae Di Pietro, Terzi et Fortini *ined.*
Geranio robertiani-Asplenietalia trichomanis Ferrez ex Mucina *ined.*
Ptilostemono stellati-Vulpietalia ciliatae Mucina *ined.*
Gladiolo italici-Ridolfietalia segeti Mucina *ined.*
Vaccinio myrtilli-Betuletalia pubescentis Mucina et Willner *ined.*
Zannichellietalia pedicellatae Schaminée, Lanjouw et Schipper ex Mucina et Theurillat *ined*.

Alliances
Aphanolejeuneo microscopicae-Colurion calyptrifoliae Sjögren *ined.*
Empetro hermaphroditi-Betulion pumilae Mucina, Willner et Grabherr *ined.*
Festuco amplae-Agrostion castellanae Theurillat *ined*.
Festuco italicae-Nardion strictae Di Pietro, Terzi et Fortini *ined.*
Fragario vescae-Populion tremulae Willner et Mucina *ined.*
Geranio sylvatici-Betulion pumilae Mucina et Willner *ined.*
Polygono alpini-Poion laxae D. Lakušić et Mucina *ined.*
Quercion macrolepidis Zohary ex Di Pietro et al. *ined.*
Ranunculion confervoidis Béguin et Theurillat *ined.*
Rorippion islandicae Béguin et Theurillat *ined.*
Salvio fruticosae-Pinion brutiae Konstantinidis, Mucina et Bergmeier *ined.*

Typified and corrected syntaxa described validly earlier

Class
Anomodonto-Neckeretea Mamczarz 1978

Orders
Alchemillo-Deschampsietalia caespitosae Passarge 1976
Dalmatelletalia polyformis Ercegović 1932
Hydroverrucarietalia Černohorský et Hadač ex Klement 1955
Hyelletalia caespitosae Ercegović 1932
Rhizocarpetalia Klement 1949
Salicornietalia Br.-Bl. 1933
Vaccinio-Pinetalia Scamoni et Passarge 1959
Umbilicarietalia Oberd. ex Klika et Hadač 1944

Alliances
Alopecurion utriculati Zeidler 1954
Caloplacion pyraceae Klement 1955
Caltho-Deschampsion caespitosae Passarge 1976
Centaureo dalmaticae-Campanulion Horvatić 1934
Cladonion arbusculae Klement 1949 *corr*. Bültmann in Mucina et al. 2016
Crocynion membranaceae Klement 1950
Honckenyo-Crambion maritimae Géhu 1968
Molinio-Hordeion Horvatić 1934
Parmelion physodis von Krusenstjerna 1945
Posidonion oceanicae Br.-Bl. ex Molinier 1960

Associations
Physcietum caesiae Motyka 1925

Reference

Weber, H.E., Moravec, J. & Theurillat, J.-P. 2000. International code of phytosociological nomenclature. 3rd edition. *Journal of Vegetation Science* 11: 739–768.

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Supporting Information

Additional Supporting Information may be found in the online version of this article:

Appendix S1. Sources of taxonomic concepts and nomenclature of the EVC1, EVC2 and EVC3 (and accompanying species lists feeding the EuroVegBrowser – ESL1, ESL2, ESL3).
Appendix S2. Overview of survey and overview work that served as major literature sources of the EuroVegChecklist.
Appendix S3. Glossary of vegetation – scientific, ecological, geographic terminology used in the verbal diagnoses of the syntaxa.
Appendix S4. Hierarchical systems structuring the conspecti EVC1, EVC2 and EVC3.
Appendix S5. Manual for the installation and use of the EuroVegBrowser.
Appendix S6. ESL1: List of diagnostic species of classes of the plant communities dominated by vascular plants (EVC1).
Appendix S7. ESL2: List of diagnostic species of classes of the plant communities dominated by mosses and lichens (EVC2).
Appendix S8. ESL2: List of diagnostic species of classes of the plant communities dominated by algae (EVC3).
Appendix S9. Selected references linked to the classes of the EuroVegChecklist 1 (see EuroVegBrowser application).
Appendix S10. Selected references linked to the classes of the EuroVegChecklist 2 (see EuroVegBrowser application).
Appendix S11. Selected references linked to the classes of the EuroVegChecklist 3 (see EuroVegBrowser application).
Appendix S12. Manual for the EuroVegChecklist Expert System.

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